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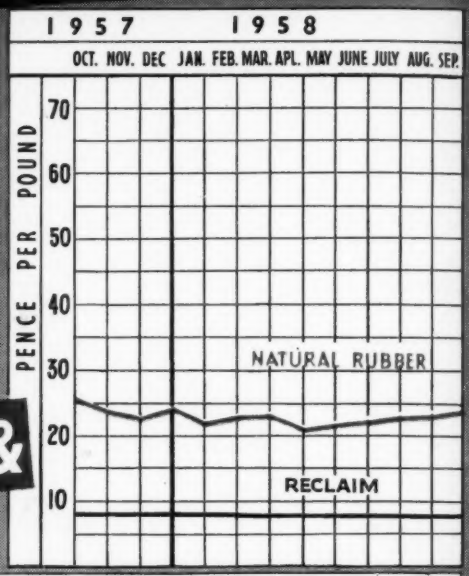

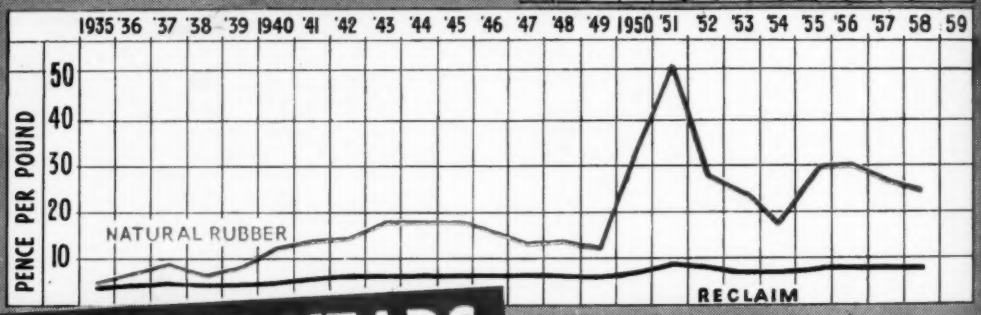

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IN ITS 75th YEAR

February 14 1959

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NOTES of the WEEK

Industrial Training

EMPLOYERS are being urged, in a report issued by the British Employers' Confederation, to train more young workers during the 'bulge' years than will be required to meet their immediately foreseeable requirements. Employers' organizations are being pressed to take prompt action so that industry will be ready to take full advantage of the situation that in 1961 to 1965 some 35% more children will on average reach the age of 15 each year than in 1956. According to the 1951 Census there were about 3m. skilled men in England and Wales in occupations to which entry is normally by apprenticeship. The present annual recruitment of apprentices is nearly 100,000 a year. If industry were to take an additional 35,000 apprentices a year for each of the 5 years, without making any allowance for wastage during training, it would at the end of that time have added about 175,000 trained men to the total skilled labour force—an addition of about 6%.

The report recalls that the Carr Committee on the Recruitment and Training of Young Workers in Industry concluded that industry would be able to absorb the extra entrants at levels commensurate with their abilities and that the problem presented by the 'bulge' is not one of absorption but of increasing training facilities. It is stressed that absorption of potential trainees cannot be taken for granted but can be achieved only if employers arrange their training budgets for the next few years on the basis of wide and continuing expansion.

Future Years

IN determining recruitment for future years, in addition to making good any present shortage of skilled labour, the B.E.C. report emphasizes that consideration must be given to the longer-term factors which will dominate the country's economy. One of the points made in this connexion is that the growing fierceness of international competition will compel more frequent replacement of machines, and this will only be practicable if shiftworking becomes more widespread which will in turn require an increased supply of skilled labour. Quite apart from these purely economic considerations, the report continues, employers must recognize the serious social results which would follow a failure to provide future young entrants to industry who are suitable for training with the opportunity of being trained.

Job Interest

SOME—perhaps much—industrial unrest is due to workers feeling that they are working in a fog, if not a vacuum. That is to say, a man does, always, one operation, or a limited number of operations, and beyond that everything is, so to say, 'an open and shut case' for him: he often does not see, and is not told, where what he does fits in—and how essential it is. This lack of feeling himself to be a significant part of a whole is a state of things which will have to be attended to more and more as automation spreads. If a worker knows himself to be creative, that is half the battle. Alternatively, there is the possibility of giving him a direct financial interest, and this has been described as a quick way to get 'each aware of the other.' In one particular scheme, cash is to be advanced to employees to take up ordinary shares in the company concerned, to yield 6%. The minimum price is to be 90% of the average market quotation since the last accounts. Repayment of the loans is to be made from dividends, and to begin with the scheme is to apply to the technical staff. Shareholders' interests are to be safeguarded by putting a limit (10% of the company's ordinary capital) on the total number of employees' shares which will be issued and by provisions to prevent the sudden sale of shares in large numbers. There are, of course, other similar schemes designed to make employees feel that they are working 'with' rather than 'for' and there is much to be said for them, not least from the point of view of employer/employee relationships and the need for higher productivity.

International Gyrations

SOMETHING of the basically nonsensical nature of national barriers is shown by the recently reported triumphal progress of the hula-hoop craze beyond the so-called iron curtain. Reports from Poland have it that in Warsaw eight hoop manufacturers are working day and night, but are so far failing to meet the demand and that street vendors are asking up to 30s. per hoop. Consignments are being rushed from other quarters, it is understood, to aid the hoop-starved Poles. Incidentally, we cannot vouch for the reported discovery that while the Western world rotates its hoops to the right, Poles and Russians give theirs a leftwards twirl or, further, that the Chinese employ an entirely different movement.

NEWS *Briefs*

US MONSANTO POLYTHENE—MALAYAN PREMIER RESIGNS — ACRYLONITRILE PLANT FOR OHIO FRENCH BUTYL RUBBER — PLANTATION WAGES

●**Guatemala** — The United States Development Loan Fund has granted a five million dollar loan to the Guatemalan Government to help develop a rubber-producing area of 80,000 acres. Guatemala plans to invest 41 million dollars in a seven-year-project.

●**Indonesia** — The Amsterdam Rubber Plantation Co. made a net profit of 1,310,432 guilders in 1958 against nothing for 1957, when large sums were booked to reserve for depreciation. The annual report says that a dividend of 5% is being proposed whereas the 1957 dividend was passed. The report stresses the new attempts that have been made to extend the company's plantation interest outside Indonesia, particularly by participation in existing or fresh projects in rubber and palm oil. Research investigations are now in full swing in this respect.

●**United States** — The Standard Oil Co., Ohio, has announced that it will build a multi-million-dollar plant at Lima (Ohio) to manufacture 'acrylonitrile', a principal raw material for wool-like synthetic fabrics.

●**France** — Industrial production of butyl rubber will start in Paris in March. Esso Standard — one of the founders of Societe du Caoutchouc Butyl—has announced. Two oil companies — Esso Standard, French affiliate of Standard Oil of New Jersey, and Cie Francaise de Raffinage, have already begun producing isobutylene, which is the basic material for making synthetic rubber. Societe Du Caoutchouc Butyl (SOCABU) is to produce 20,000 tons of butyl rubber a year.

●**Malaya** — The Malayan Planting Industries Employers' Association and the National Union of Plantation Workers have signed an agreement on wages. The agreement gives increased wages to 200,000 workers in the country. The signing brings to a close negotiations which have lasted 13 months. The wage agreement lays down a basic wage of 2.48 Malayan dollars a day irrespective of the number of trees tapped, provided the price of rubber remains above 70 cents a lb. The agreement, which will last 12 months, also provides for incentive payments and a bonus dependent on the rubber price.

●**United States** — The Monsanto Chemical Co. has announced that the capacity of its Texas City, Texas, plant for high pressure polythene plastic will be raised from 67m. to 100m. lb. a year. Construction on the expansion has begun, and the project is scheduled for completion during the third quarter this year.

●**Japan**—The United States Rubber Co. announces that it will assist the Nitto Tyre Co. of Tokyo in the production of pneumatic tyres and tubes under a technical service agreement approved by the Japanese Government. The agreement also provides for production by Nitto of US Royal Brand tyres for export sale by US rubber, providing the American firm with a base for expanded business in Asia. US Rubber will furnish Nitto with modern production techniques and product designs.

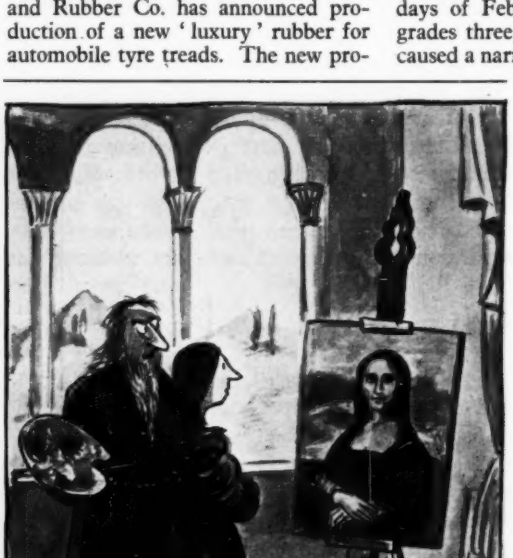
●**United States**—The Goodyear Tire and Rubber Co. has announced production of a new 'luxury' rubber for automobile tyre treads. The new product—called 'Plioprene'—will, it is claimed, provide a softer ride, reduce squeal and add other important improvements.

●**Japan** — Consumption of crude rubber in Japan in December 1958 totalled 11,340 tons, the Japan Rubber Importers Association estimates. This compares with 11,000 tons in November.

●**United States**—The Mansfield Tire and Rubber Co. plans to build a new industrial plant at Paris, Texas, to manufacture tread rubber. The 500,000 dollar plant would produce about 750,000lb. of rubber a month and be operated by Mansfield's subsidiary Pennsylvania Tire Co.

●**Russia**—Singapore rubber dealers say that Russia—formerly one of Malaya's major customers for high-grade rubber — has switched its demand to lower grades. Of 36,000 tons of rubber which Russia bought in Malaya in January and the first few days of February, 70% consisted of grades three, four and five. This has caused a narrowing of the price margin between high and low grades on the Singapore market. The dealers think that Russia might be using the low grade material in conjunction with synthetic to make tyres.

●**Malaya** — Tunku Abdul Rahman, Prime Minister of Malaya, announced on Monday that he had resigned. The Tunku made his announcement at an extraordinary meeting of the United Malays National Organization (UMNO), the party of which he is president. He said he had resigned in order to devote all his time to party matters. The Deputy Prime Minister, Dato Abdul Razak Bin Hussein, succeeds him.



'Honestly Mona, if only they'd invented erasers I'd alter that silly smirk I seem to have given you!'—426

Safety in the Rubber Industry*

ACCIDENTS CANNOT BE AFFORDED

By C. G. LYNCH†

AS I am not addressing safety officers I do not intend to stress the humanitarian side. We can all assume that no one wants to see a fellow-employee hurt; only a sadist or an imbecile would disagree with this statement, so I will try to convince you that the rubber industry cannot afford accidents.

You have all heard of the Factories Acts and probably at some time or other a number of you have thought some particular Act a nuisance. I do not intend to go through these Acts or to mention them further than four which, although not directly connected with the rubber industry, will probably lead you to consider that these Acts have done a lot for the majority in this country.

In 1819 an Act was passed that no child under nine years of age was to be employed in the cotton and textile industry. This was brought about because it was discovered that when water power replaced human power, children at the age of five onwards could then do some of the work previously carried out by the older children. In 1833 a further Act was passed that children under 13 could not work for more than nine hours daily, and those of 13 were limited to 69 hours weekly.

In 1842 we had the Mines Acts. Women and child labour not allowed to work underground—up until this time young children and women were harnessed to coal trucks to drag them to the pit shaft, load the coal into baskets, and bring them to the surface. After this Act was introduced, ponies were used, but there were complaints that they cost more. In 1901, when all the previous Acts were consolidated under the Factories Acts, employment of child labour under 12 years of age was prohibited.

Bad accidents at that time were an accepted part of industry. The present day position is that there are over 180,000 accidents each year in industry causing absence from work for more than three days; in addition over 700 people are killed—this does not include injuries and deaths in quarries, mines, etc. Over 20,000,000 man days are lost every year in factories alone through injuries. This is about six times the number of man days lost through strikes, and the cost to the country in terms of cash has been estimated at £300,000,000 a year.

At this stage I should like to quote verbatim a part of Mr R. W. Lunn's recent talk where it applies to costs, and before so doing I think that I had better explain the meaning of 'Frequency.' This is the yard stick for measuring accidents all over the world and is the number of lost-time accidents occurring during every 100,000 hours worked. Mr R. W. Lunn said:

Financial Aspect

'The second reason for accident prevention work in our industry strikes an entirely different note. Here we put aside all thoughts of men's feelings and their sufferings and anxieties. We talk in terms of money—a precise and harsh subject. At our National Safety Conference of 1955 our chairman, Mr Tuckwell, presented a paper on the cost of industrial accidents. The estimates which he made were not extravagant. They were carefully done and probably they are underestimates. I shall take one figure from the paper and look at it from perhaps a new angle. He estimates the cost of a lost-time accident at £350. In the figures we publish on our accident experience we find that the average frequency in the industry is about 1.0. That means that in each 100,000 hours worked, one lost-time accident occurs—and that costs £350.

Each 100,000 hours we work in the industry costs us about £350 for our lost-time accidents. Do a little arithmetic and you will find that that amounts to 0.84d. per hour. Someone may be tempted to think the figure is not too bad. But many factories work at a frequency much below 1.0 and many others work at a frequency much above 1.0. The average of them all is about 1.0. When does the figure become too bad to tolerate? Here are a few to think about:

The hourly cost at a frequency of 1.0 is 0.84d.

At 1.5 it is 1.25d.
At 2.0 it is 1.68d.
At 2.5 it is 2.09d.
At 3.0 it is 2.52d.

There is nothing wonderful about those figures. They are schoolboy arithmetic. Anyone can work them out. Probably each one of us knows the accident frequencies of the factories with which he is concerned. Each one of us can determine the rate at which money is flowing out in terms of a cost per hour for every hour worked. It is as simple as that—it is a cost per hour for every hour worked.

This may be a new way of thinking about accidents but it is true. Immediately it produces the question —How much can you afford?—and each man must seek his own answer. I believe that many will find cause for grave discontent.

To me the two most powerful impulses to work on accident prevention in industry are the two I have just described. It would be difficult to find impulses which contrasted more sharply — the humanitarian one which none of us can escape, or the consideration of our pockets which is, indeed, a very practical issue. In spite of the contrast I accept both these impulses as being worthy ones and in this I believe that many of you will stand with me.'

Accident Frequency

I think it is true to say we are all in agreement with Mr Lunn, but let us refer to the frequency figures published by the Rubber Manufacturing Employers Association for 1958. The various companies are listed each under a code. Quite a number have a frequency over 3.0 and the worst a frequency of 8.25. I hope that at least one representative of this latter company is here today and, if so, he must realize that through bad management his workpeople are suffering unnecessarily and if I were a shareholder I should ask a few pertinent questions. This is plain speaking but I represent no one and can say what others are not in a position to say and I think that you must agree with me that these high frequency figures are entirely unnecessary when at the other end of the frequency table the first seven company's frequency figures added together come to 0.86—and I happen to know that included in this seven are two of our largest companies and two of our smallest.

I am appalled at the lack of know-

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* *From a paper given to the IRI London Section.*

† *Firestone Tyre and Rubber Co. Ltd. Vice-chairman of the Safety Officers' Advisory Committee to the National Joint Industrial Council of the Rubber Industry.*

ledge of how to eliminate accidents that exist at all levels on the shop floor. I also feel a little bitter. The industry has a safety committee, a safety officers advisory committee and an engineers committee, and nearly all the answers have been given during the last 10 years to the industry by these three committees which have worked very hard indeed. Yet we have had a more or less static frequency figure of a little over one during the last six or seven years. In fact, since 1955 it has dropped only 0.1.

Lack of Determination

At our bi-annual conference last year the Chief Inspector gave us a target for November 1959. That target is 0.9, a figure that this industry can achieve quite easily if only one lost-time accident was saved by each company each month. I do not think it necessary to stress any further that the industry cannot afford accidents. How is it then one may ask that a number of companies in the industry have such a comparatively large number of accidents. In my opinion there are two main reasons for this. A lack of determination from higher management to substantially reduce them, and failure to utilize the information that is available to all through the NJIC of the industry.

I would like to stress the point that there are no secrets between the various companies on the best way to eliminate hazards. We may keep trade secrets from each other but this definitely does not apply to safety, and the full benefit of many pounds spent in experimenting on different safety methods by the larger companies, is there for all, merely for the asking.

I do not want to stress the technical difficulties in regard to making machinery safe, but I will refer to one thing the engineers committee have carried out—making safe the two roll mill. *(Mr. Lynch showed a sound film on safe working on mills and in referring to this quoted again from Mr Lunn's talk.)*

Bibliography

In 1950 we produced *A Guide to the Factories Acts*. There have been three editions of this and an up-to-date edition is in the process of being published. Nearly everyone must have some kind of duties in connexion with the Factories Acts which cover health, safety, and welfare. This booklet, which will tell you all you want to know in plain English, has been available for over eight years. The next booklet is called *Studies of Accidents in the Rubber Industry*. It is a summary of the accident experience of a considerable portion of the rubber industry when over 26,000 accidents of all types were examined and analysed. This report gives a positive guidance for accident prevention in an absolutely practical manner. Again, as a further supplement to this guide a number of publications have been issued, some of these that come to my mind are *Hand Knife Accidents, Recommended Safety Measures, Prescribed Records, Reports and Notices, Safety in the Use of Inflammable Solvents*, and so on.

The accident investigation card is a card made out for each person attending the works hospital for first-aid. A cross is made in the square against the appropriete main cause of the accident. It is taken by the injured employee back to the supervisor whose job it is to see that the questions on the card are answered with the aim of removing the cause of the accident. In my own case, I estimate we have had a true reduction of 30% of our accidents since it was introduced, but I feel I must give a warning. If your company has a bad frequency figure due to bad housekeeping, etc., your maintenance section will be inundated with work that it will not have time to carry out, and the whole scheme will fizzle out unless you take care to plan out this work on a system of priority. It is a splendid scheme for the companies who have a fairly good frequency figure.

'Gospel of Safety'

There has also been a number of other hints published and at the moment a pamphlet is being sent each week to all member firms giving one at a time a resumé of nearly all the matters concerned with safety. These are issued free, and there is no restriction on the numbers sent out. My own company has 250 each week for distribution to management and foremen.

I expect quite a number of you are saying or thinking that there is nothing new in all this but I am making no apologies at all. It was evident to me last month that the gospel of safety had not got over to all the people that matter in the industry. Gospels are old stuff, the same thing repeated time after time, and it is only by repeating the story that it eventually reaches to all the people. If I have not convinced you that the industry cannot afford lost-time accidents it can only be because I have not presented the case properly. If I have convinced you then I sincerely hope that you will do your best, however small, to try to reduce accidents in your particular sphere. The industry cannot afford a frequency rate figure over one. It so happens that 100,000 hours is the length of the average man's working life. When a young man enters the industry we can say to him, we have a good superannuation scheme, good sports facilities, a splendid canteen and (if the frequency rate is 1.0) we can guarantee you a lost-time accident! I will conclude with this sombre thought.

Shell Plastics Plant

Shell Chemical announces that it is proceeding with the construction of large-scale polyolefin manufacturing facilities at the petrochemicals factory at Carrington, Manchester. First stage production is to be 30,000 tons a year of polythenes and polypropylenes, including high-density polythenes. These products will be manufactured under Ziegler licence, exclusively held in the UK by Petrochemicals.

Sir J. Dean Joins BICC Board

Sir John Dean, chairman of the Telegraph Construction and Maintenance Co., has been appointed a director of British Insulated Callender's Cables.

This follows the latter company's successful bid for Telcon. Sir John is chairman of the Institution of the Rubber Industry.

Rubber Contract Notices Served

The AFL-CIO United Rubber Workers' Union has completed the formalities of putting the 'Big four' rubber companies in the US on notice for reopening contract negotiations.

Canadian Asbestos

Factory shipments by Canadian manufacturers of asbestos products amounted to $29,988,000 in 1957, down 12.4% from 1956's record high total of $34,240,000, according to the Bureau's annual industry report. Some 17 establishments (16 in 1956) employed 2,222 persons (2,249), paid them $8,312,000 in salaries and wages ($8,528,000) and spent $13,694,000 for materials ($15,965,000).

In the report of a long-service presentation to Mr Alexander Irwin, of the Clyde Rubber Works Co. Ltd., which appeared in *RJIP* of January 24, we stated incorrectly that he had retired. Mr Irwin, who has been 60 years in the rubber industry, has no intention of retiring from business just yet.

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Plastics at Work

DUCTING AND PIPELINE DESIGN

By DAVID ALEXANDER

Design and material variations considerably affect manufacturing costs of fume extraction ducting and pipe lines made from plastics materials.

TO date one of the biggest drawbacks to the use of plastics in the manufacture of fume extraction ducting, pipe line systems and other plant is the initial relatively high cost against traditional metals, although this can, in many cases, be offset by the very much longer life of the plant. Apart from this, however, production costs can also be reduced greatly by the proper selection of materials and by the use of systems designed as much as possible to use standard sheet and tube sizes and fabricating techniques most suitable to each material. It may, therefore, be useful to compare one or two techniques, particularly with regard to cost, bearing in mind the effect of these on efficiency and strength.

A large percentage of plastics engineering production is usually concerned with the manufacture of fume extraction plant including, very often, long runs of ducts, hoods and scrubbing units, and it is this particular type of plant which is the most costly to produce.

In examining the manufacture of plastic fume ducting in general it is fair to say that most of the comments will also apply to other plastic fabricated products, to a greater or lesser degree.

In manufacturing and installing the average ducting system, one of the first things which can affect cost is the method by which the ducting will be joined when erected on site. There are three normal techniques used as illustrated in Fig. 1. The first of these is the spigoted and socketed joint which makes use of one run of weld. The second is the sleeved joint which uses two runs of weld, and the third uses flange joints which involve a great deal more welding and material than the other two techniques plus the cost of gaskets and the necessary bolts.

The first two techniques, therefore, are in normal circumstances the more economical and of these the first, that is the spigoted joint, is usually the cheaper due to the fact that it is not normally possible to obtain easily sleeves with an internal diameter equivalent to the outside diameter of the duct. The only circumstances where the flanged system may be more satisfactory is where high pressures are involved, or where there are no staff available to weld plastics, or where it is possible in the foreseeable future for the system to be dismantled and repositioned. Additionally, the first or second techniques allow for easy final dimensional adjustment on site which allows for speedier erection and

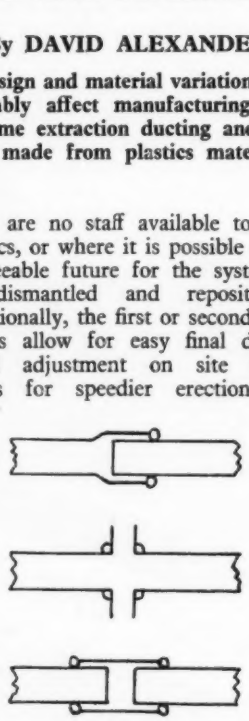


Fig. 1

leaves a margin for possible inaccuracies in measurement or changes in plant position. It is possible, in the case of the first technique, to expand the expansion socket on site using the standard duct as a former which is inserted in the pre-heated end of the tube to which it is mating. When the expanded end cools there is a tendency to contract, which, even in itself, without welding, becomes a very tight joint. Therefore, even by jointing techniques savings can be effected in the manufacture of plastic fume extraction plant.

In the case of large diameter ducting such as 36in. and upwards, the ducts are constructed from rigid PVC sheet, or in some cases polythene, which is pre-heated and formed to the necessary diameter, the edges being drawn together ready for welding. A factor which influences production costs more than any other is welding. There are various schools of thought on this matter and some firms subscribe to the technique of using one large triangular welding rod on ⅛in. thick sheet while others prefer to use three smaller round welds. There are arguments in favour of both, but one cannot help but feel that the three weld technique is the more satisfactory in making an efficient seal, particularly as if the first run does not give an entirely homogeneous joint the other two runs probably will and therefore offer an added element of safety. Also, of course, there is a smaller area to heat during the welding process. In the case of triangular welding rod, there is no second chance, the weld must be completely homogeneous in the first instance and, as can be appreciated, even the best of operators can occasionally slip on this matter, both in metals and in plastics. In the case of metals, however, these are usually more easily traceable through X-ray techniques.

Another influencing factor with regard to welding costs is that in some cases the sheet thickness required is over-estimated. Particularly in the case of first installations, companies, through lack of experience, err on the side of excessive safety and select for fume extraction ducting ¼in. thick material, where in many cases, this is entirely unnecessary. As can be seen from Fig. 2 the use of this thickness involves an increase of 100% in welding time apart from a 100% increase in the cost of materials. This is an example of where the importance of

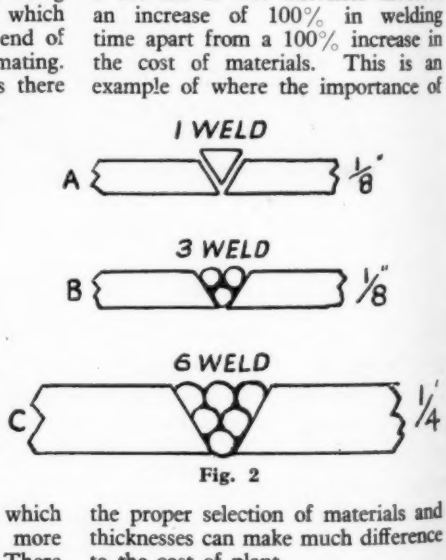


Fig. 2

the proper selection of materials and thicknesses can make much difference to the cost of plant.

Very often in deciding to install fume extraction ducting in plastics materials the specification calls for rectangular

duct for no other reason than that it may look better, or that in the case of metals rectangular ducting has always been installed. With the exception of building exigencies, there seems to be very little that can be said in favour of such ducting as apart from giving less efficiency, the rectangular system and the flow charateristics of such a system cannot be as good as those of a circular system of equivalent area. Comparing the production costs of two equivalent systems in plastics will show that there is a strong case in favour of the use of round ducting against rectangular wherever possible. Fig. 3 shows a rectangular 12in. x 16in. duct which has an equivalent area to a 15in. diameter round duct. In the first case the rectangular system will involve at least one weld at one corner on this particular size, whereas the round ducting of 15in. diameter does not involve

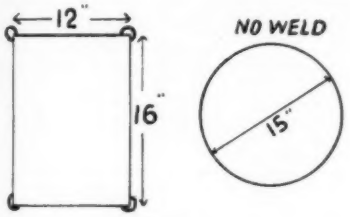


Fig. 3

welds at all as this is a size that is commercially extruded. Also to be remembered is the fact that round ducting is available in this diameter in up to 20ft. lengths whereas even with one weld on a rectangular equivalent system, to have a 20ft. length one must also allow for the cost of spigoted welded joints at approximately 4 to 5ft. intervals.

In the case of larger sizes of rectangular ducting, it is very often necessary to weld at two corners and in many circumstances to weld every corner whereas in the case of cylindrical ducting it is possible to go up to considerable diameters by the use of heat forming and one weld area only. Again, as can be seen from Fig. 2, the question of material thicknesses will also influence these comparisons.

Going further on the matter of fume extraction, in most cases the extraction points are processing baths or chemical tanks, and dependent on the density and concentration of fume involved various alternative forms of extraction can be used. In Fig. 4 there are illustrated three types of extraction from chemical baths, each of which is satisfactory for particular concentrations of fume. Therefore, in designing a fume extraction system in plastic it is as well to determine the concentration involved as system A, although the least efficient, is also the least expensive and may be entirely suitable for the purpose. If a greater concentration of fume exists than can be competently dealt with by system A, then system B may prove sufficiently satisfactory. Only in more severe conditions would it be necessary to consider the use of system C which, although the most efficient, would cost at least three times the price of system A. Therefore, again savings can be effected by examination of such details.

Not only, however, should such things as jointing and extraction points be considered. Also in the positioning and layout of ducting, fans and extraction points considerable differences in costs can result. Very often there is some small factor such as another service, *e.g.* a steam line or electric conduit line, which can stop the use of the most direct system. In such circumstances it is very often very much more economical to move these obstructions slightly rather than to install the fume extraction system in another way.

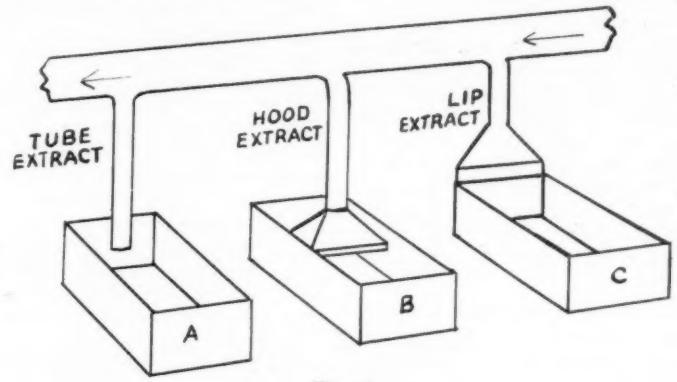


Fig. 4

In Fig. 5 an example of this is given. At point X there is an acid sink with a fume extraction hood, and at point Y a PVC fan unit. There are three methods of extracting the fume from point X to point Y. At point Z there is a conduit obstruction which means that extraction must take place with the fan

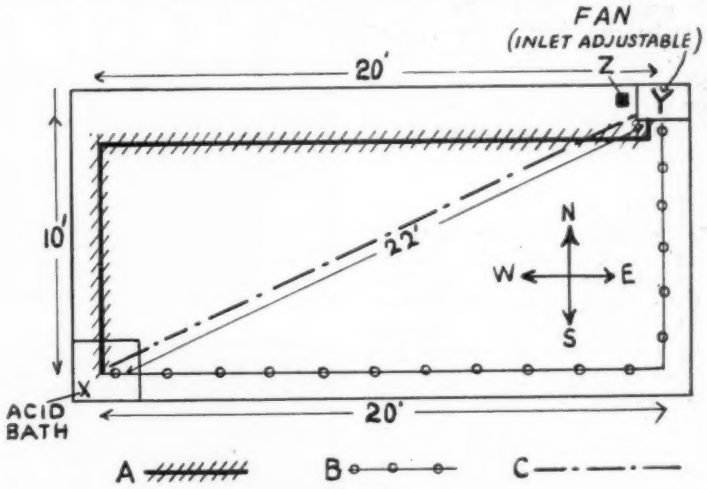


Fig. 5

A, approximately 30ft. of 12in. i.d. × ⅛ W.T. PVC plus 2 off 90° bends plus 8 welded flanges
= 30 × 15s. per foot plus 2 × £3 10s. plus 8 × £2 5s.
= £22 10s. plus £7 plus £18 = £47 10s.
B, approximately 30ft. of 12in. i.d. × ⅛ W.T. PVC plus 1 off 90° bend plus 6 welded flanges
= 30 × 15s. per foot plus 1 × £3 10s. plus 6 × £2 5s.
= £22 10s. plus £3 10s. plus £13 10s. = £39 10s.
C, approximately 22ft. of 12in. i.d. × ⅛ W.T. PVC plus NO bends plus 4 welded flanges
= 22 × 15s. per foot plus nil plus 4 plus £2 5s.
= £16 10s. plus £9 = £25 10s.

inlet pointing south. This, therefore, necessitates the use of two 90° bends in order to permit entry to the fan inlet, and in view of the fact that the fume extraction system was to be installed overseas by a chemical firm with no experience in plastic welding, the whole system was to be supplied in flanged lengths. On further examination it was found that there was no objection to the system being taken round the other way as illustrated in system B. This, therefore, eliminated one 90° bend and two welded flanges which, of course, reduced costing. Comparisons of these two costings can be seen below Fig. 5.

However, even the price of system B was considered excessive for the purpose required, but it was pointed out that if it was permissible for the fan inlet to point south-west and not south, a very great further saving could be effected. This was found possible by extending the belt drive through the wall to the motor mounted externally. At the same time the outlet point of the extraction hood was positioned to point north-east, therefore allowing a direct coupling between points X and Y. As can be seen in Table 6 this allowed for a saving of 8ft. of 12in. material, eliminated the use of bends and reduced the number of welded flanges by two in comparison with Table B.

In examining these three systems it can be seen that by the selection of design three completely different costings can be obtained with approximately a 50% reduction between the most expensive and the cheapest.

Conclusion

In conclusion, therefore, it can be seen that by a combination of factors and by the use of certain techniques and designs considerable differences in the costs of fume extraction systems can result and while these differences may not be of importance on a £50 job, this cannot be so with a £2,000 system where, by the selective use of techniques, design and specification, it is not unrealistic to hope for a saving of say £500 without reducing the efficiency of the system and in many cases in fact giving an increased efficiency to the plant. It is factors such as these indicated above plus varying basic material costs which may help to explain some of the differences in quotation figures submitted by various plastics engineering companies.

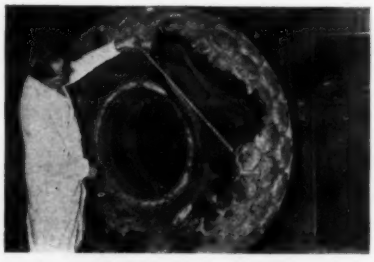
Giant Tyre Repair Service

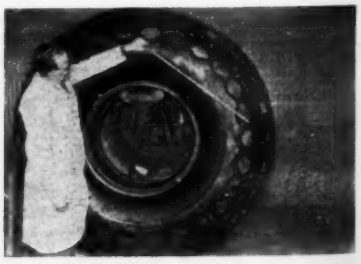
GIANT tyres used on earthmoving equipment are subject to damage from such hazards as buried iron stakes, jagged tree stumps, and flints, etc., but unlike road tyres, which are, of course, smaller, less weighty and cheaper, it is not exceptional for a giant tyre to cost £900 to replace. Realizing the need for an effective repair and remoulding service for 'off the road' tyres, Tyresoles Ltd., Wembley, Middlesex, have opened a new section, now in full operation.

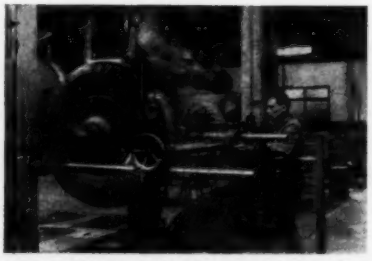
Because of the necessity of rapid repair of earthmoving equipment tyres, the company is operating an 'Application for Quotation' scheme, which they state, has worked particularly well. On a carefully devised form the damage is described and, without seeing the tyre, Tyresoles give an immediate estimate of the cost to put the tyre back into service.

The savings to the tyre users offered by the company are considerable, but they vary to some extent even between tyres of the same nominal size. For example, the difference in ply rating affects very considerably the cost of a new tyre, but this has no bearing on the Tyresoles retreading price. While the saving on the lower ply ratings is considerable, the saving on the higher ply ratings is very high. The table (*below*) gives an indication of the savings which can be made. In addition to repair, an aspect of the section is the protection of giant tyres by sidewall protectors. An annular band of thick protective rubber is vulcanized to the sidewall of the tyre and this takes the shocks of impacts and guards against penetrations by iron stakes or tree snags. The sidewall protectors can be fitted to one or both sidewalls and have also been used to replace steel sidewall plates on mobile cranes.

Size		Ply rating	New cost £ s. d.	Bead-to-bead remould process treatment charges £ s. d.
1800-24	Tubed	16 Ply	179 13 0	90 17 6
1800-24	,,	20 ,,	237 3 0	
1800-25	Tubeless	20 ,,	255 17 0	90 17 6
1800-25	,,	24 ,,	322 7 6	
2100-24	Tubed	20 ,,	275 12 6	122 15 0
2100-25	Tubeless	20 ,,	300 13 6	122 15 0
2100-25	,,	24 ,,	342 5 0	
2700-33	,,	24 ,,	856 18 0	
2700-33	,,	30 ,,	926 5 0	366 17 0
2700-33	,,	36 ,,	1,044 1 0	
2400-25	,,	18 ,,	410 16 0	190 0 0
2400-25	,,	24 ,,	487 8 0	
29.5-29	,,	22 ,,	532 8 6	283 3 0
29.5-29	,,	34 ,,	656 4 0	







The tyre (*above left*) has been rendered useless by contact with a stake or other hidden snag. The damage has been cut away revealing what might previously have been an impossible task to repair. After repair (*above right*) the tyre is ready to go back into service. It has been reinforced inside and revulcanized so that the repair is integral with the original casing. Tyres have to be stripped down to their under-tread (*below, left*) for rebuilding and remoulding. Special machinery (*below right*) is used to buff the stripped surface to take the new tread stock

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Conductive Rubber

ELECTRICAL PROPERTIES OF HIGH POLYMERS—3

THE third lecture of the evening course on the electrical properties of high polymers was held at the National College of Rubber Technology on Wednesday January 21. The lecturer was Mr R. H. Norman, and his subject was 'Conductive Rubbers.'

Mr Norman commenced by defining the terms conductive and antistatic rubber. By conductive rubber was meant material with a volume resistivity between the limits 1 ohm.cm. and 10^{10} ohm.cm. Antistatic rubbers were included in this range, but at the higher end only. The minimum resistivity for a rubber to fall in the antistatic class was difficult to fix, it depended upon the rate at which charge was generated upon the material when in use. Generally, however, antistatic rubbers would have resistivities of 10^5 ohm.cm. and higher. The term conductive rubber therefore included the class of antistatic materials, but the converse was not necessarily true, because antistatic rubbers should not be too conductive. The addition of carbon black to a rubber would always lead to a conductive material if enough was put in, although some blacks were much better than others in this respect. There were other ways of making conductive rubbers which did not involve the incorporation of carbon black, such as the addition of ionizable materials to the rubber, but these methods were not used very frequently.

Methods of Test

The various methods of testing conductive rubbers were dealt with in the next section of the lecture. Particular stress was laid upon the difficulties caused by the effects of contact resistance between the rubber and the measuring electrodes. This effect should be minimized by the test technique. It was best to bond the electrodes to the rubber during vulcanization, and some examples of test pieces made this way were shown by Mr Norman. If the specimen to be tested was already cured, then tinfoil electrodes could be stuck on using aquadag. The most satisfactory measurement technique was to use a circuit in which a Lindemann electrometer was used as a null deflection device. In this circuit, the potential developed across potential probes lying on the rubber surface was balanced against a known voltage. For this method, the sample of conductive rubber was in the form of a strip a few cms. long, and current electrodes were put on each end. The current passing through the rubber also went through a standard resistance and the voltage drop across this was also measured by the electrometer circuit. This method, using potential probes, which were two parallel stainless steel wires one cm. apart, was very satisfactory for two rubbers whose resistivity was less than about 10^6 ohm.cm.

Resistivity

Methods for the measurement of the resistivity of a rubber product were next discussed. The case of a castor wheel on a hospital trolley was taken as an example of the use of a conductive rubber. In this case the outer electrode would be a certain area of water on the tread. Although water as an electrode gave a high contact resistance, its use was very convenient and it gave fairly consistent results. In general, the lecturer stated, service tests were not very reliable.

Mr Norman next discussed the vexed question of contact resistance in some detail. It could be shown that if c was the contact resistance and r the resistivity, then $c=k.r^n$, where k was a constant for the contact system and n was generally about 1.5. Thus the ratio of r^n to c increases as r increases, and low resistivity materials were the easiest to deal with, since c increased more rapidly than r. The value of k for any electrode system should be low, and values of k could be taken as a measure of the goodness of the system. Some values were given, for example k was less than 0.02 for brass electrodes bonded onto the rubber as it was vulcanized, whilst $k=0.2$ for tinfoil and aquadag electrodes. For evaporated gold electrodes, k was 0.3 whilst for electrodes made by binding wire round the ends of the specimen and painting with aquadag $k=0.5$. The worst value of k was found when the electrodes consisted of tinfoil stuck on to the rubber with normal sulphuric acid, when $k=4$. These conclusions applied only to conductive rubbers, and the equation quoted earlier could not be extrapolated into the region of higher resistive rubbers.

It was an interesting point that some electrodes would show a potential difference between them when in contact with the rubber before any current flowed through the material, presumably there was a kind of cell effect. The use of mercury electrodes for conductive rubber measurements was not satisfactory, and neither was the painting on of aquadag circles, as the transverse resistant of the aquadag could be greater than that of the rubber.

The effect of extraneous factors upon the measurements was next considered. Voltage variations had little effect upon the resistance of the rubber but had a large effect upon that of the electrodes. If the rubber surface was cleaned, swelling should not happen, and so it was best to use acetone as a cleansing fluid since the swelling effect was low. Factors determining the conductivity of rubbers were next mentioned. The particle size and shape of the carbon black used was very important, as also was the chemistry of the surfaces involved. The effect of carbon black could be predicted by the equation $\log R = -A.\log S + B.\log H + C$ where R was the resistivity, H the hydrogen content of the black, S its surface area, and A, B, C were functions of the concentration of the black. The mixing procedure had an important bearing upon the result, and the resistivity of the same compound mixed at different times could vary by a factor of up to 1,000. The reason for these differences was not known, but some of the factors which caused it could be (a) plasticity of the rubber before adding the black, (b) the amount of remilling, which affected the carbon black breakdown, and (c) the temperature changes before and during milling.

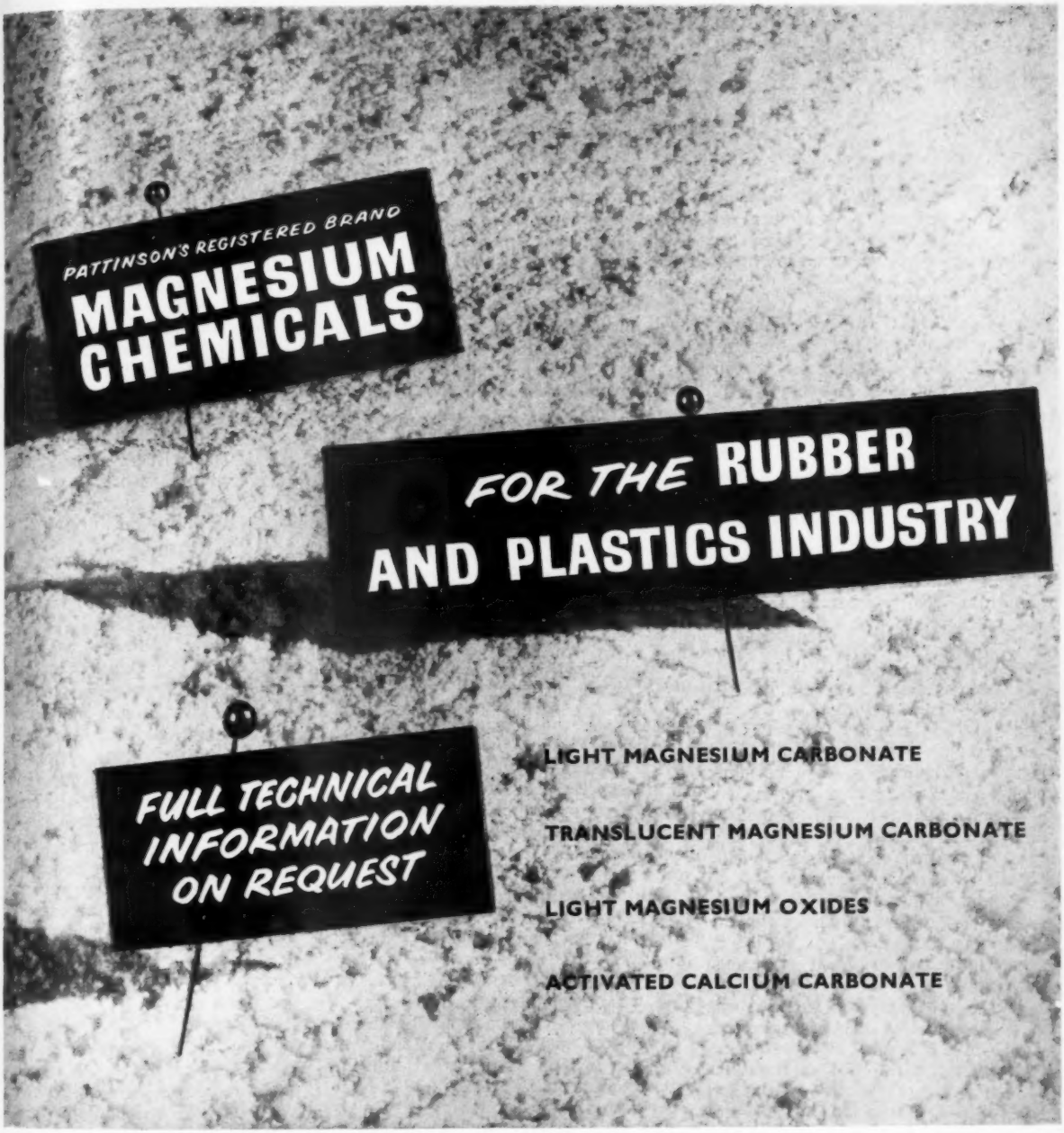
Experimental Results

By showing a graph of some experimental results, Mr Norman illustrated the fact that it was not necessary to start with a good conducting polymer to produce a low resistivity material on the addition of carbon black. In fact a poorly conducting polymer could give a more highly conductive material than a good conducting polymer for the same amount of black.

The effects of heat and strain upon the resistivities of conducting rubbers were next dealt with, and the Bulgin triangle and the Mullin's Effect mentioned. It could be shown that the time taken over the testing and the humidity had little effect, and the ageing of the specimen also caused little variation in the test results.

Finally the lecturer mentioned some of the uses of conductive rubbers. The use of conductive rubber inserts

Continued on page 250



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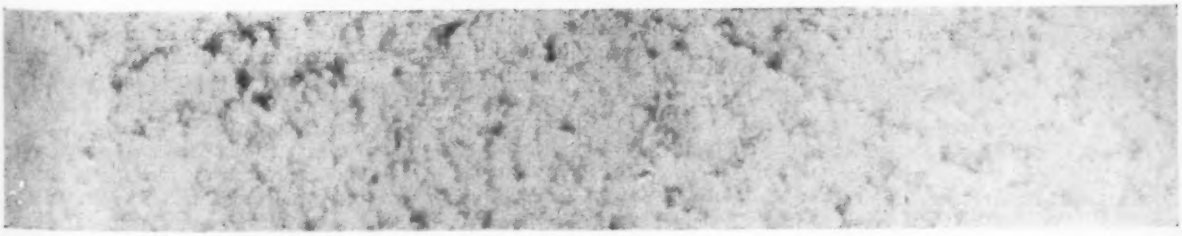

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MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

WHEN the Court of the Worshipful Company of the Horners met in London last week, it elected new officers, one of whom in particular is among the leading figures in the plastics world, Mr H. W. Graesser-Thomas. He becomes the new Upper Warden. The new Master is Mr M. W. H. Lancaster, a well-known chartered accountant, and the Renter Warden is Mr W. A. Cooke. Viscount Brookeborough, Prime Minister of Northern Ireland, who was Master last year, now becomes Deputy Master.

As I have said, the choice of the Liverymen which made Mr Graesser-Thomas Upper Warden is of much interest, but also it has a special significance. Not only is he a leading figure in the plastics industry, but it was during the first year of his chairmanship of the British Plastics Federation—he held office from 1944 to 1946—that the Horners approached the plastics industry, through the Federation, suggesting what Mr Graesser-Thomas so appropriately calls a 'marriage' of the ancient craft of the Horners with the modern industry of plastics. He has thus not only a niche in its history, but he has also from the start been able to take a prominent part in its development, for at once, on his becoming himself a Horner, he was elected to the Court, and has been a member ever since.

As most readers will know he was also President of the Institute from 1947 to 1950, and some years ago was made one of its Fellows, all of which is natural, because he has not only had a life-long connexion with chemicals and plastics, but he also has a hereditary interest in it. A Welshman from the lovely Vale of Llangollen, he is chairman of Graesser-Thomas Ltd. and he is also associated with R. Graesser Ltd. founded by his grandfather as long ago as 1865—the first manufacturer in the world, I am told, of phenol. Mr Graesser-Thomas' company has in the course of its time acted as agents for many well known undertakings, including the Yorkshire Tar Distillers, the Scottish Tar Distillers and R. Graesser Ltd.

As his friends well know, Mr Graesser-Thomas is an inveterate traveller. He tells me that he is shortly leaving London on his 105th visit to the United States—and nobody would call him an old man yet! I am sure everybody will wish him good health and good fortune in the new duties which he is now shouldering, and those others which will inevitably come to him in the course of time.

Mr David Radford and E. K. Cole

There are one or two interesting little pendants to the information which we printed last week about the presentation to Mr David Radford, director and general manager since 1956 of Ekco Plastics Ltd. with the Alkathene Trophy. I need not dilate upon the honour which came to Ekco Plastics by winning this first annual design competition instituted last year by I.C.I., but the moment is opportune to say a word or two about Mr Radford himself, and about his association with the industry.

He comes from Burton-on-Trent, where he was educated at the Grammar School, and he joined Ekco as works manager of the radio factory in 1943 from Morris Motors. He was appointed general manager of the plastics division of E. K. Cole in 1945, and became executive director in 1951. Upon the formation of Ekco Plastics Ltd. in 1956 he was given the dual post which he now holds, and as many of our readers know he last year became vice-chairman of the British Plastics Federation, having been previously chairman of its publicity committee. In that year, too, Mr Radford helped to make history, for he travelled on the first regular Comet 4 flight to the USA to represent the British Plastics Federation at the annual conference of the Society of the Plastics Federation Inc. in Chicago, and at the international forum he spoke on the position of the plastics industry in this country.

In other ways also, however, 1958 was an outstanding year for Ekco Plastics. Apart from the receipt of the Alkathene Trophy it will be recalled that they received the award of the Horners' Company given annually for young designers under 30, which went to Mr Brian Smith, N.D.D., L.S.I.A., who joined the company in 1955. An award, given by the Council of Industrial Design, also came to the company for the fine work of Mr M. Oliver Rowlands, M.F.I.A., the Welsh-born head of the Ekco Plastic Design Studios for the Ekco 'Superbath.'

Mr Radford must be proud of his record of successes, which more than justify his farsighted policy on excellence of quality, and on price.

Rubber Mills

Following the notes in these columns last week, Mr John B. Young, technical manager of Reed Bros. (Engineering) Ltd., has pointed out that the first rubber mill to be mounted on BTR Vibro insulations in Great Britain was built by his Company and installed at the AN Rubber Co., of Frodsham, in 1948. In this connexion he has sent me a copy of *Ten Years Progress in Mill Design*, a comprehensive illustrated brochure which gives a lot of interesting technical information about this type of installation including brief details of the new 'Monoblock' mills. I understand that he will be pleased to send copies to anyone who may be interested.

Lost and Found

And now for a little piece on the lighter side. From a Midlands friend comes the story of a 10s. note lost by a Wolverhampton tyre-maker, Mr Ray Benton, 12 months ago, and now found inside the wall of a truck tyre manufactured by his firm, the Goodyear Co. Mr. Benton lost it while moving stocks before vulcanization, when it fell from his overcoat pocket, apparently into one of the tyres. It must have been vulcanized in the position in which it was found the other day, when the tyre was being changed at a Dundee depot, approaching 400 miles away. At first it was taken for a stamp, but then it was identified, almost completely moulded into the casing, and covered by a thin strip of rubber. *Postscript:* The note, little damaged, has now been returned to Mr Benton.

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VIEWS and REVIEWS

The Perkin Medal

THE Perkin Medal of the American Section of the Society of Chemical Industry for 1959 has been awarded to Mr Eugene J. Houdry (*Chemistry and Industry*, 1959, (3) January 17, 71).

When, in the early Edwardian days—on the occasion of a trip to New York—I had the pleasure of attending a meeting of the American section, it was, if I remember rightly, a comparatively small, but lusty and attractive, infant. Today its importance may be judged by the fact that its Perkin Medallist is elected by a jury representing the American Section of the Society of Chemical Industry, the American Chemical Society, the American Institute of Chemical Engineers, and the American Section of the Société de Chimie Industrielle.

At the annual Award dinner which took place on January 9 at the Waldorf-Astoria Hotel, New York, and at which the chairman of the American Section, Dr W. E. Hanford, presided, the 53rd Perkin Medal was presented by Dr Wallace Cohoe to Mr Eugene J. Houdry.

The Medallist

Mr Houdry's name is by no means unknown to rubber chemists and technologists. He was 'cited' for his contributions on catalysis, having originated, as *C and I* mentions, 'the catalytic cracking process for converting petroleum into high-octane gasoline. He also pioneered the development of butadiene for the manufacture of synthetic rubber and in the isolation of carbon-13.'

Air Pollution

It is particularly interesting to note* that in accepting the Perkin Medal, Mr Houdry said that 'Air pollution was one of the most pressing problems confronting our industrialized society,' and he is quoted as having 'advocated immediate and thorough study of the effects of air contaminants on human health.'

(*Note:* *My friend Dr R. Lessing, of whom *The Times*, commenting on the last Birthday Honours (June 12 1958) remarked '. . . Dr Rudolph Lessing, president of the National Society for Clean Air, receives a C.B.E.—12 days after the Clean Air Act came fully into force'—has written to me (at my suggestion) regarding Houdry's reference to air contaminants (as above), as follows:

'Eugene J. Houdry who was presented with the Perkin Medal in New York on January 9 has done very much on the catalytic cracking and other treatment of petroleum and its products. Arising out of that he devised a small gadget to be fixed to the exhaust pipes of motor vehicles in which the combustion of the unburned vapours in the exhaust gases is to be completed. . . .'

Obviously the future of this type of device for reducing the hazard or nuisance of combustion gases will be watched with interest.

Dr Lessing has kindly sent me some further information re air pollution to which I propose to return on another occasion.

Polycarbonates

In the issue of *Chemistry and Industry* reporting on this year's Perkin Medal Award, there is also a report of a meeting of the Plastics and Polymer Group of the Society of Chemical Industry held on January 6 to hear a paper by Dr W. Hechelhammer (Farbenfabriken Bayer) on 'Polycarbonates: their properties, processing and applications.'

I think it is desirable to point out that Mr C. E. Hollis (Chairman of the Group) who presided, said, in the course of introducing the speaker, that the Group 'had always tried to provide their members with the latest information in the plastics field.' He was, therefore, particularly pleased that the reader of the paper was there 'to tell them about a new polymer, and he believed that this was the first technical meeting in Britain at which its properties had been described.'

Nature of Polycarbonates

With regard to the production of polycarbonates Dr Hechelhammer said 'that these were made by reacting p-p-dihydroxy diaromatic compounds with carbonic acid derivatives.' As examples he instanced 'the reaction of diphenylopropane (bisphenol A) with carbonyl chloride or p-p-dihydroxy diphenylmethane and diphenyl carbonate.'

Passing over some further details of production it may be mentioned that products with molecular weight in excess of 200,000 could be made. These were known as 'Makrolon,' or in the cast condition as 'Makrofol.'

Properties

With regard to properties of the polycarbonates the lecturer said that they could be used up to 120°C. and were thermoplastic at 200°C., and decomposed between 310°C. and 340°C. Amongst the other properties mentioned it was stated that the materials showed great dimensional stability and could be heated to nearly transition temperature (second order transition at 140°C.), without dimensional change, for long periods.

For a thermoplastic it showed excellent tensile (about 10,000 psi) and flexural strengths. The stress strain curve showed low elongation and only minor cold flow. Impact strength was high, and elongation at a stress of 3,500 psi after one year was still 'nil.'

With regard to chemical resistance this was about the

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

same as that of polystyrene but had not the universal resistance characteristic of polyamides.

Applications

Passing over the author's remarks regarding behaviour to solvents and processing techniques, a few words may be devoted to *Applications*. Dr Hechelhammer showed a large number of samples and also exhibited slides. The materials shown included helmets, nails, small gears, precision parts, sound recording tapes, household articles, transparent containers, lamp-shades, parking lights for cars, beakers, dishes, ampoules and parts of milking machines.

For various other points raised in the discussion regarding properties and applications, the chemistry of the reactions involved in manufacture, etc., I must refer readers to the *C and I* report, but on the commercial side it was mentioned that the current prices in Germany were 10DM per kilo. At present reasonable quantities were available in the UK at 9s. lb., but it was hoped that as production increased the latter might be reduced.

Tyre Abrasion

Rubber Chemistry and Technology (1958, Volume XXXI, Page 650) publishes a paper by G. J. Van Amerongen, J. F. Benders and H. C. J. de Decker (Rubber-Stichting, Delft, Holland),* on 'Tire Abrasion at Different Temperatures.'

In the introduction the authors mention that in a previous paper (*ref. given*) they showed how reliable results can be obtained in the study of such an apparently variable process as the abrasion of motor car tyres. I do not propose here to repeat the details given by the authors but, in this connexion, they say 'if proper precautions are taken, the short standard test gives a sufficiently reliable and statistically accurate picture of the actual abrasion of automobile tyres.'

Results and Conclusions

Amongst the details in the authors' *Results and Conclusions*, the following may be mentioned:

a. It appears that the abrasion of SBR is considerably less dependent upon temperature than that of NR, but under the conditions for abrasion used NR shows a smaller abrasion loss than SBR at a temperature range below about 16°C.
b. Abrasion loss by NR/SAF tread is appreciably less than by the control tread of NR/HAF at the test temperatures. It also appears that the abrasion of NR/ISAF tread is appreciably less dependent on temperature than other treads made of NR and SAF or HAF.
c. The extension of NR with 25% of oil leads to a somewhat higher abrasion loss in the case of temperatures corresponding to moderate climates.
d. The oil extended natural rubber/ISAF compound is just about as costly as the unextended natural rubber/HAF compound. According to the course of the abrasion graphs, the combination ISAF/oil will give appreciable advantages at air temperatures above 15°C. In the temperature range 25° to 30°C., it shows abrasion losses just about as low as SBR/HAF.

* Translated for *Rubber Chemistry and Technology* by W. D. Wolfe, from *Kautschuk und Gummi*, August 1957, **10** (8), WT204, 206 and 208. Report No. 317a (1956) of the Rubber-Stichting, Delft, Holland. The present address of G. J. van Amerongen and J. F. Benders is Koninklijke/Shell Laboratory, Amsterdam, The Netherlands, and of H. C. J. de Decker is U.S. Rubber Co., Passaic, New Jersey.

Note

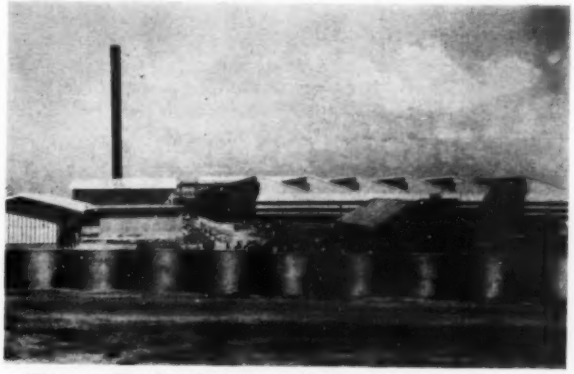
Messrs Chance and Hunt have sent me (a) A new booklet dealing with their 'Baytown' Masterbatches (Carbon Black/Synthetic Rubber) (from Latex/SBR). This covers data relating to Latex; Preparation (polymerization); Objectives; Chemical and Physical Properties; Packaging, etc. Details were compiled by Dr Drogin, Dr Susie, and staffs. Now available for export from USA. (b) Booklet, by Dr Drogin (Vice-President, United Carbon Co.) entitled 'A Simple Direct Method for Examining the Dispersion of Carbon Black in Rubber' (previously reviewed on this page).

PHILIP SCHIDROWITZ

Dunlop in India

TYRE FACTORY WORTH £1,800,000

A NEW Dunlop tyre factory worth £1,800,000 was opened on Thursday at Ambattur, near Madras. Designed to contribute to the expansion of road transport envisaged under India's second Five Year Plan, it will have an annual output of two million cycle tyres and 134,000



The new Dunlop factory at Madras, shown above, was opened on February 12

giant tyres. To streamline production it will not handle either the manufacture of motor car tyres or inner tubes, which will be concentrated at Dunlop's existing factory at Sahaganj, near Calcutta.

The present site was selected partly because of its excellent water supply—a tremendous amount of water is used in tyre manufacture—and partly because of its nearness to the port of Madras and the consequent availability of road and rail communications, electric power and engineering services. A total of 600 people will be employed at the new factory, whose opening coincides with the sixtieth anniversary of Dunlop's association with India.

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Questions Corner—59

(Second Series)

255. Can condensation resins, using formaldehyde as one of the reactants be used as ion-exchange resins?

256. What is 'popcorn' polymerization?

257. Give some account of the use of polymethyl methacrylate for dental applications.

258. How are cellulosic sponges produced?

(Answers next week)

Answers to Questions Corner—58

251. For the production of novolaks, acids are normally used as catalysts, *e.g.* hydrochloric, oxalic, sulphuric and phosphoric. Hydrochloric acid is a good general catalyst because it is cheap and the reaction is quite rapid. Sulphuric and phosphoric acids are not so commonly used. Oxalic acid, on the other hand, has the advantages that it is not corrosive to metals used in the reaction vessels, and it gives a paler resin than when hydrochloric acid is used. Alkali catalysts can be used and some give a faster curing resin than those made with an acid catalyst. Zinc oxide, magnesia and aluminium hydroxide have been used (USP 2,464,207; BP 615,488).

For the manufacture of resols caustic soda and ammonia are used. The former gives a quicker reaction than the latter and also results in a fast curing resin. Ammonia is used for making solid resols and Barium hydroxide is used when a resin containing no soluble electrolytes is required. Other catalysts suggested are sodium carbonate, lime and pyridine.

252. Essential tests for synthetic resin lacquers depend, to some extent, on the type of lacquer in question and its service use. Some products will also require more control than others.

Adhesion. In this case the important factor is the application to which the particular lacquer is to be put. If a lacquer primer is to be used *e.g.* in motor work then tests should be made for adhesion to steel but, on the other hand, if for top coats then adhesion to the undercoat is more important. *Viscosity.* This needs no emphasis as it is important that a uniform product is produced. Tests are usually made at room temperature so a conversion chart is provided for converting the readings to a standard temperature. *Fineness of grind.* For pigmented lacquers this is an essential as variations in the quality of the grind will result in varying shades, and also the appearance of the dried film will vary. Hard pigments may cause considerable trouble with wear on the grinding mills but result in a paint of smooth texture.

Other tests which may not be necessary as regular control tests, but require consideration in certain cases and development work are: Hardness, flexibility, rubbing and polishing, bleeding, sanding, chemical resistance, weathering, brushing consistency. There may also be a special tests required for Government, and some industrial, specifications.

253. The following is a brief summary of some rough identification tests for various cellulosics, but it must be emphasized that they are only intended as first indications of the nature of the material:

BURNING TESTS

Cellulosic	Ease of ignition	Flame	Odour
Cellulose acetate	Easily melts	Yellow, black smoke	Vinegar
Cellulose acetate butyrate	Easily melts	Yellow, blue edges, some black smoke	Strong butyric acid
Cellulose nitrate	Very easily	Yellow, burns completely	Pungent
Ethyl cellulose	Easily melts	Yellow, blue edges	Practically none
Methyl cellulose	Easily melts	Yellow	Practically none
Cellophane	Easily melts	Yellow	Burnt cotton
Carboxymethyl cellulose	Easily	Yellow. Paper like	Faint characteristic

SOLUBILITY TESTS

	Soluble	Insoluble
Cellulose acetate	Methyl chloride	Butyl acetate
Cellulose acetate butyrate	Butyl acetate	Pentane
Cellulose nitrate	Acetone	Pentane
Ethyl cellulose	Toluene/alcohol 80/20	Pentane
Methyl cellulose	Water	Acetone
Cellophane	None	All organic solvents
Carboxymethyl cellulose	Water	Acetone

254. There are several variables that will affect the speed and reaction in the production of phenol-formaldehyde resins amongst which are:

The structure of the phenol. As formaldehyde reacts with phenol at the o- and p- positions of the benzene ring, a methyl group at the m- position increases the reactivity. If the methyl group is in the o- and p- positions this will reduce the reactivity (J. Amer. C.S. 1941, *63*, 334).

The curing and solution properties of the phenolic resins depend on the structure of the phenol. The presence of alkyl groups may make the product oil soluble. Products made with phenols with substituent groups at the o- and/or p- positions are virtually non-curable and remain fusible.

Ratio of reactants. The speed of the reaction is dependent also on the ratio of formaldehyde to the other reactant. Generally, the time increases as the ratio of formaldehyde to cresol or phenol increases (JSCI 1938, *57*, 189; J. Amer. C.S. 1941, *63*, 334). As the number of formaldehyde molecules introduced increases to form the polymethylol derivatives the presence of the OH groups makes the product increasingly water-soluble.

Catalyst. The rate and course of reaction is greatly affected by the presence of acid and alkali, and increases with the concentration (JSCI 1938, *57*, 189). When a phenol and formaldehyde are condensed, either a novolak or a resol may be formed. The phenol-formaldehyde is, of course, a deciding factor but the type of product formed depends also on the choice of catalyst.

Temperature. As a general statement it may be assumed that the reaction rate approximately doubles for each 10°C. rise in temperature, but there are some exceptions (JSCI 1947, 66, 337 J. Amer. C.S. 1941, *63*, 334).

Reaction media. The presence of a non-aqueous solvent in the mixture may reduce the rate of reaction (J. Amer. C.S. 1952, *74*, 2713).

(More questions next week)

Polly Ester Says . . .

'A spinneret is a young female spider.'

IRI Elections

AT a meeting of the Council of the Institution of the Rubber Industry on January 27 1959 the following elections were made:

Chairman of Council, Mr George Martin (re-elected). Vice-chairman and honorary treasurer, Mr S. D. Sutton (re-elected).

The following recommendations for the Board for Diploma elections were unanimously approved:

Admission to the Fellowship, A. J. Hughes, Ian Kemp, A. A. Round, Walter Saul and W. E. Stafford.

The Council recorded its grateful thanks to those who had served as referees of papers submitted for the Transactions and Proceedings during the year. The 1958 list is as follows: H. J. Alcock, J. M. Buist, Mr Burridge, H. J. Chard, Dr A. Charlesby, Dr R. G. Cockbain, D. H. Cooper, Dr W. Cooper, J. W. Denson, Dr C. F. Flint, V. E. Gough, T. E. H. Gray, W. A. Gurney, J. A. Haworth, W. H. Hogg, M. Jones, C. E. Kendall, C. H. Leigh-Dugmore, Dr W. McG. Morgan, Dr D. Parkinson, M. G. Peakman, R. W. Pearson, F. C. J. Poulton, F. H. Puxty, Dr J. R. Scott, D. W. Sear, G. A. Shires, Dr Staudinger, W. H. Stevens, Dr Watson, Dr W. C. Wake, G. E. Williams and E. C. Woods.

The Council of the Australasian Section has appointed the following officers for the year 1958/59: Chairman, R. G. Waller; vice-chairman, A. R. E. Challiner, A.R.A.C.I., A.S.T.C.; hon. secretary, G. R. Weate, A.R.A.C.I., A.R.M.T.C.; hon. treasurer, L. G. Harrison, A.P.I.A.; committee: W. J. Barry, B.Sc., A.S.T.C., J. B. Golding, A.P.I.A., C. W. Davey, A.R.M.T.C., B. M. Cavanagh, M.Sc., B.A.

SPECIAL MEETINGS

A one-day symposium on 'Adesion,' arranged jointly by the London Sections of the Institution of the Rubber Industry and the Plastics Institute, is to be held on Friday April 17 1959 in the William Beveridge Hall of the University of London Senate House.

The Fourteenth IRI Foundation Lecture is to be delivered by Dr J. R. Scott on Friday May 29 1959 at the Cafe Royal, London.

CONDUCTIVE RUBBER

Continued from page 242

to obtain a more uniform cure round inner tube valve seatings was described. An interesting application in the field of cable manufacture was in the prevention of electrical breakdown. This breakdown was caused by the presence of small air pockets between the cable core and the inner surface of the rubber insulation, owing to the impossibility of producing a completely perfect rubber to metal bond throughout the length of the cable. If a sheath of conducting rubber was put next to the metal core, and the insulating layers were over this, then breakdown was prevented. This was because the conducting rubber took up the potential of the wire, and therefore there was no potential difference across the air pockets and breakdown did not take place.

This lecture completes the first half of the course which was given by Mr Norman, the remaining three lectures will deal with more specific problems and also with polymers other than rubber.

Mr Stanley B. Nicolson has been appointed deputy chairman of Storey Brothers and Co. in place of Colonel Gerald W. Sharpe, who has resigned from the Board for health reasons.

New US Polythene Compounding Plant

The US Industrial Chemical Co.'s polythene compounding plant at Tuscola, Illinois, has recently come into operation with an initial capacity of 25 million lb. per year. According to Dr Robert E. Hulse, executive vice-president of National Distillers and Chemical Corporation, and general manager of its US Industrial Chemicals Company Division, the new plant would compound polythene resin with carbon black and other additives to produce electrical and pipe resins. Production from the new plant would support the company's efforts to expand sales of polythene for use in electric wire insulation and plastic pipe.

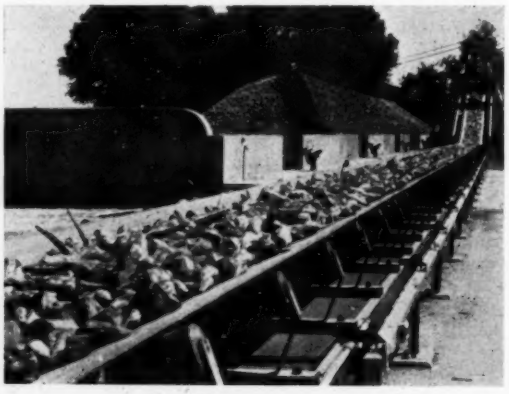
The primary objective of the new plant, according to Dr Hulse, was to assure production of high and uniform quality polythene compounds which were necessary to meet critical electrical insulation requirements. Operation of the compounding plant would enable the company to maintain highest standards of quality control and customer service, he added.

US Cabot Appointment

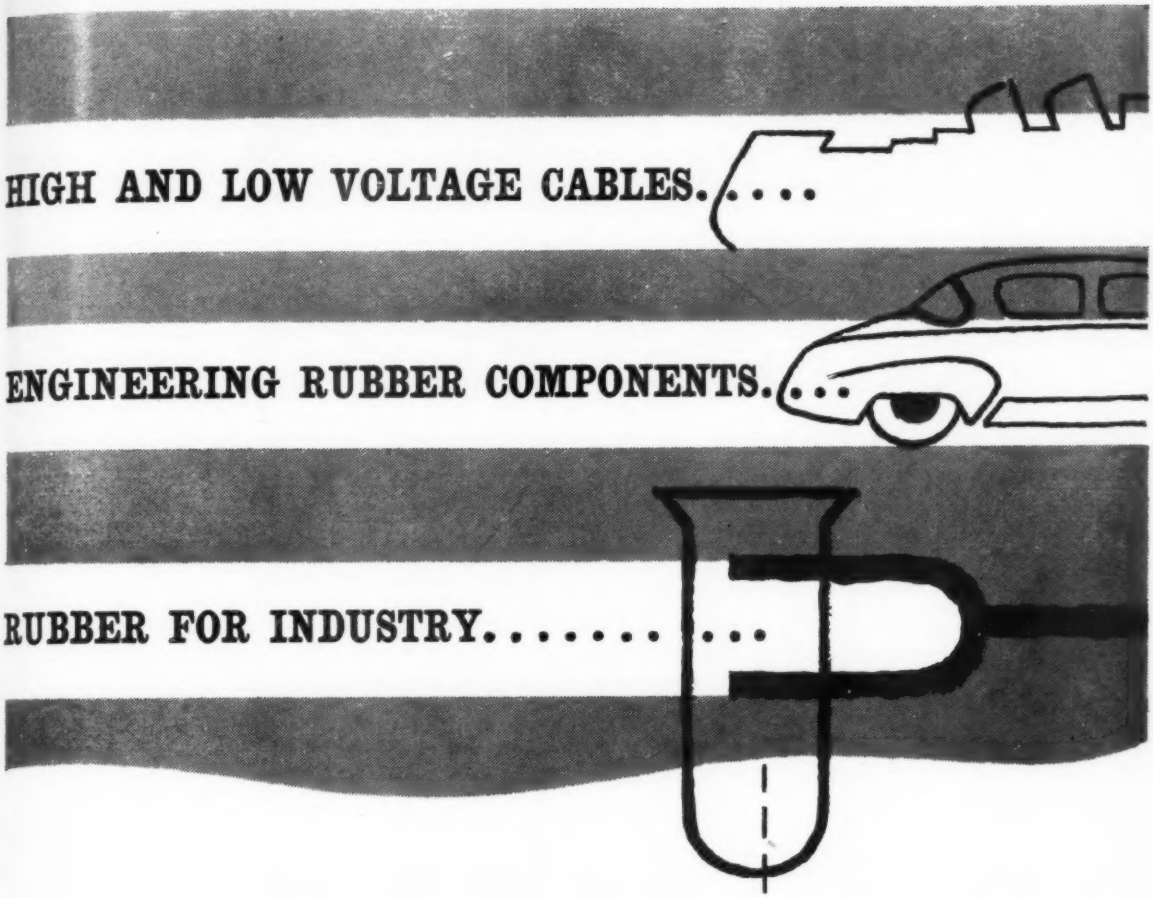
Dr Avrom I. Medalia has been made head of the fundamental research section of the Carbon Black Technical Department of Godfrey L. Cabot, Inc., carbon black and chemicals manufacturers, of Boston, Massachusetts. Dr Medalia was formerly senior research chemist of the Organic and Polymer Section of the New Products Research Department at Cabot's Research and Development laboratories in Cambridge, Massachusetts.

Firestone Canada

The Firestone Tire and Rubber Company of Canada Ltd. have announced three appointments at the Company's Hamilton, Ontario, plant. Robert Taylor, formerly production manager, is named factory manager; Alfred Horrax, who has been chief engineer, now succeeds Mr Taylor as production manager; and R. Strand, staff engineer at the Company's plant 2, Akron, Ohio, is appointed chief engineer at the Hamilton plant.



Dunlop conveyor belting in use at the sugar factory at Mezzano, near Ravenna, of Eridania, Italy's largest sugar manufacturers. The order for this belting was obtained by Dunlop in the face of strong competition from other belting manufacturers, including Italian firms



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Rubber Statistics

MALAYAN IMPORTS AND SHIPMENTS — THAILAND — SWITZERLAND

THE December figures for imports and ocean shipments of rubber for the Federation of Malaya and Singapore combined have now been released from Malaya House. The following tables are expressed in long tons:

Ocean shipments to	Sheet and crepe	Latex
UK	10,423	2,404
USA	19,317	3,243
South Africa	1,258	143
Canada	2,535	77
Australia	2,390	446
France	3,208	295
Western Germany	5,409	908
Italy	3,686	436
Netherlands	752	537
Poland	4,214	—
Spain	1,524	150
Sweden	1,412	79
USSR	12,130	—
Yugoslavia	1,611	—
Argentina	1,687	91
Japan	7,692	911
Others	6,168	336
	85,416	10,056

Imports from	Total
Indonesia	
Sumatra	17,381
Borneo	8,686
Others	2,146
British Borneo	3,728
Thailand	1,042
Others	184
	33,167

The December ocean shipments, at 95,472 tons, were only some 5,000 tons below the year's highest monthly total, reached in August last, of 100,421 tons. The December figure brought the year's ocean shipments to the record total of 1,080,536 tons or some 6,000 tons more than the 1957 total. Compared with the previous month, shipments to the UK were down by about 1,000 tons, but shipments to the US had risen from some 15,000 tons to over 22,000 tons. Shipments to the USSR were again at a very high level, but were some 4,000 tons lower than the previous month's total of 16,455 tons. Once more, there were no shipments to China, while shipments to Japan, at over 8,600 tons, were again high, though nearly 1,000 tons below the previous month's figures.

Imports of rubber into Malaya were nearly 3,000 tons below the November total, Indonesia accounting for most of the decline. The year's total for imports was also a record amounting to 413,324 tons, compared with the 1957 total of 363,271 tons, imports during the previous three years also having reached about the same figure.

The following table shows, in tons, ocean shipments during 1958 arranged in order of importance of country of destination. It will be seen that some two-fifths of Malaya's rubber went to three countries, the UK, the US and Japan, while 12 countries accounted for four-fifths of the total. The third column is percentage of the total.

UK	190,880	17.8
USA	135,504	12.5
Japan	110,738	10.2
Western Germany	79,811	7.4
USSR	68,436	6.3
China	64,036	5.9
France	52,084	4.8
Italy	50,078	4.6
Poland	39,337	3.6
Australia	30,411	2.8
Argentina	26,010	2.4
Canada	25,925	2.4
Remainder	207,286	19.3
	1,080,536	100.0

The following table, which lists the year's imports by countries, shows that more than half of Malaya's imports during 1958 came from Sumatra, with Indonesian Borneo counting for a further quarter, and Indonesia as a whole supplying nearly 89%. British territories accounted for a mere 9.8%.

Indonesia		
Sumatra	215,750	52.2
Borneo	102,628	24.8
Others	47,938	11.6
Sarawak	33,094	8.0
British North Borneo	5,954	1.5
Thailand	4,871	1.2
Vietnam and Cambodia	1,810	0.4
Brunei	1,014	0.3
Remainder	265	0.0
	413,324	100.0

Stocks and Production

Stocks of rubber in Singapore at the end of the year totalled 44,803 tons, or 13,000 tons less than at the beginning of the year. Dealers held 34,494 tons of this total, while 10,269 tons were held at the port. In addition, a further 2,262 tons were in the course of transhipment. Pan-Malayan rubber production for the month of December amounted to 71,676 tons, nearly 40% above the November total and the highest for any month since the war. Estates accounted for 41,547 tons and smallholders for 30,129 tons. The month's production brought the total for the year to 663,624 tons, exceeding the 1957 figure by some 4%. This was the highest Malayan production total since 1950 when 694,090 tons were produced.

Thailand Rubber Exports

It is reported from Bangkok that 10,363 tons of all grades of rubber were exported from Thailand during November, compared with exports of 12,676 tons in October and 13,530 tons in September. The US was the principal destination for these exports, taking over 9,000 tons in both October and November, and over 8,500 tons in October. The UK took 1,842 tons in September and 1,308 tons in October, but a mere 205 tons in November. Exports to Western Germany declined progressively from 1,881 tons in September, to 781 tons in October and 295 tons in November. Singapore took 534 tons, 622 tons and 370 tons, respectively, in these three months.

Swiss Rubber Imports

According to statistics released in Zurich, Swiss rubber imports, including natural, synthetic and waste rubber, amounted to 782 tons in December, compared with 1,563 tons in November and 1,130 tons in December of the previous year. Of this amount, Malaya supplied 382 tons, the US 254 tons, Western Germany 66 tons, Canada 41 tons and Indonesia 31 tons.

Imports of rubber in the form of ribbons, sheets, strips and balls, excluding fabric or metal parts attached, totalled 147 tons, compared with the previous month's figure of 131 tons, and the December 1957 total of 101 tons. These imports came from: Western Germany, 54 tons; Belgium, 42 tons; France, 19 tons; Malaya, 14 tons; and Italy, 13 tons.

Plastics Exports

TONNAGE DOUBLED IN FIVE YEARS

EXPORTS of plastics raw materials from the UK in 1958, over 122,600 tons valued at over £32m., set up new records both by volume and by value, it is announced by the British Plastics Federation. The totals were advances of more than 10,000 tons and more than £2¼m. on those for 1957, when the previous highest levels were reached. The volume of the exports has been more than doubled in five years (1953 total, 56,000 tons), and is more than five times the tonnage for 1947 (21,000 tons).

The biggest buyer in 1958, as for several years past, was Australia (nearly £4.5m. compared with £4m. in 1957) and exports to New Zealand rose to over £2.4m. (1957, £1.6m.). France, just under £2m., Sweden, £1.6m., South Africa, nearly £1.5m., and the Netherlands, over £1.5m., were other large markets and exports to Western Germany, over £1.3m., were nearly double their 1957 level (£700,000). Sales to Denmark, Italy, Belgium and Norway were all over £1m. and both to Hong Kong and India, over £900,000. Exports of UK plastics processing machinery are also rising.

A forthcoming export drive of the industry is the composite display by the British Plastics Federation in collaboration with the Board of Trade, at the International Plastics Fair, Dusseldorf, October 17 to 25 1959.

Rateable Plant and Machinery

NEW LIST DRAFTED

A NEW list of all types of machinery and plant which a committee on rating considers should be liable to local rates on the principles established by the Rating and Valuation Act, 1925, has been published this week. The list revises and brings up to date in the light of modern developments the existing list now 30 years old. If approved, the new list will come into operation on April 1.

The list is contained in the Report of the Committee on the Rating of Plant and Machinery (H.M.S.O., 2s. 6d.) which was appointed by Mr Henry Brooke, Minister of Housing and Local Government to review the existing list as expressed in the Plant and Machinery (Valuation for Rating) Order, 1927. This Order divides plant into four classes:

1. Items for: (a) the generation, storage, primary transformation or main transmission of power; or (b) heating, lighting, ventilating, etc.
2. Passenger lifts and elevators.
3. Railway and tramway lines and tracks.
4. Items named in a list so far as they are 'in the nature of a building or structure.'

In Class 1 the committee have proposed that less electrical apparatus should be rated under the heading of 'main transmission of power,' so as to bring it into line with the rating of other forms of power.

The list in Class 4 has become out of date and the committee say in their report that a number of bodies have argued that it would be preferable to abolish the list and rely on the general terms of the Act. The committee disagree with this view and have prepared a new list, adding a number of items to the list of rateable plant and machinery, including not only recent developments such as nuclear reactors, radar and television masts, and wind tunnels, but also plant which existed in 1927 such as boilers, main pipelines, Bessemer convertors, bridges and precipitators. The new list omits a few items included in the old.

The committee say that industrialists have complained of a tendency in recent years for more and more plant and machinery to be rated beyond what was intended by Parliament in 1925, and have proposed a number of ways in which the rating liability of plant might be restricted. On some of these proposals the committee have reached unanimous agreement and on others they have been obliged to record disagreement.

They all reject the suggestion that plant which can be moved from place to place should be exempt. They are agreed in recommending that a new Order should expressly exempt ancillary moving parts of plant and machinery. (These are not normally rated, but the committee think the position should be put beyond doubt.)

The committee have not reached agreement on two other proposals. One is to exempt plant which moves or rotates, and the other is to exempt plant below certain dimensions which in ordinary practice is moved about.

The Minister is empowered by the Act of 1925 to make a new Order confirming with or without modifications the statement prepared by the committee which would replace the Order of 1927. It is his intention that the new Order should come into force on April 1, and he will take into account any representations on the report of the committee which are received in the Ministry by February 28.

Mr A. L. Mathewson is not seeking re-election to the Board of Asahan Rubber Estates at the forthcoming annual meeting. As a preliminary to retirement he has relinquished the chairmanship and is succeeded by Mr F. W. Harper. Mr J. Morton is recommended to fill the vacancy on the board.

A 'leopard skin' effect is being embossed on its Storoflex 638 PVC by Storeys of Lancaster, and this material is being used by Antlers, the travel goods manufacturers. The Companion case, beautifully lined in quilted moire, is part of a range including suitcases of various sizes, a dress case, blouse case and pear-shaped companion case. Retailing at £4 15s. 6d., it will be available at the end of February. Storoflex 638 is one of the latest additions to the range of PVC-coated fabrics

Patent Specifications

The following information is prepared from published Patent Specifications. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 3s. 6d. per copy (including postage).

Polymers

No. 804,641. Phillips Petroleum Co. Application and Filed, January 20 1955. Application in USA, June 1 and December 20 1954. Published, November 19 1958. Addition to No. 790,195.

One or more olefins are polymerized at a temperature up to about 450°F. by means of a catalyst comprising chromium oxide and zirconia or thoria, at least some of the chromium being in the hexavalent state. The catalyst may be used for the polymerization of ethylene and propylene and mixtures of these olefins, as well as for the polymerization of diolefins such as butadiene. The examples relate to the polymerization of ethylene.

Catalysts

No. 804,642. Phillips Petroleum Co. Application and Filed, January 20 1955. Application in USA, June 1 1954. Published, November 19 1958. Divided out of No. 804,641.

Olefins are polymerized by means of a chromium oxide catalyst mixture differing from the catalyst of Specification No. 804,641 in that a stabilizing amount of strontium oxide is incorporated in the catalyst to prevent or retard decomposition of the hexavalent chromium compounds in the catalyst. Also, the oxides associated with the chromium oxide may comprise alumina, silica, alumina-silica, zirconia or thoria. The examples relate to the polymerization of ethylene.

Shorter Abstracts

Reinforcing Material for Tyres. 804,464. Dunlop Rubber Co. Ltd. Filed, April 3 1956.—Good adhesion between rubber and twisted steel wires or twisted filaments is achieved by locking short fibres between the wires or filaments as they are twisted. The filaments may be rayon, nylon or 'Terylene' and the short fibres are preferably cotton but may be a synthetic material.

Plastisol Composition. 804,496. W. H. Sanders (Electronics) Ltd. and C. A. Redfarn. Filed, November 15 1956.—An allyl ester monomer is used as a component in a paste-forming PVC composition to form a thermo-setting plastisol composition.

Fillers. 804,834. Deutsche Gold- und Silber - Scheideanstalt vormals Roessler. Filed, April 15 1955.—Silicates are produced by treating an aqueous suspension of a naturally-occurring material containing silicon dioxide, in combined or free form, with an alkaline earth metal hydroxide at an elevated pressure and temperature. The silicates are used as fillers for rubber and plastics.

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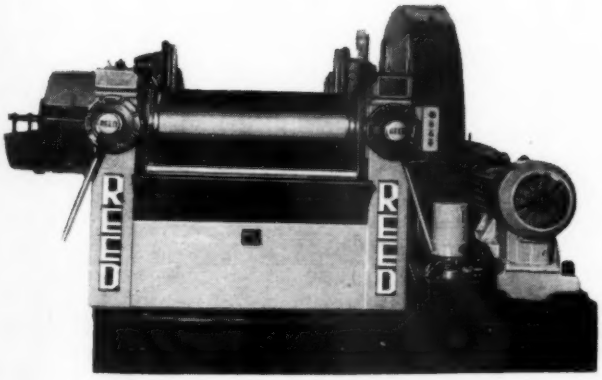

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Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE London stock market is still behaving very cautiously. There is little incentive for buyers, and until the election outlook becomes more clear it is doubtful whether the sellers will be in any great hurry to offload their shares. One might sum up the present position by saying that it is one of stalemate, and certainly on most of the recent dealing days this would have appeared a correct assessment. Prices for the most part have drifted. There has been small profit taking among most of the leading industrials, while on the other hand there are obvious signs of 'specialist' buying of 'fringe' shares—those with a high and reasonably safe yield.

The current mood of the market is fully reflected by our list of shares. A quick glance will show the irregular pattern which is fairly constant in most sections these days. Industrial leaders like DUNLOP, COURTAULDS, and IMPERIAL CHEMICAL INDUSTRIES have all fallen away from their high points. TURNER AND NEWALL ordinary are now down to 71s. 3d., compared with a high point of 73s. 9d. There was, of course, some disappointment with the full results which were taken to indicate a continuance of the pressures on profit-margins and a not-too-hopeful short-term outlook.

Despite being recommended in several national periodicals the ordinary of DISTILLERS eased further to 24s. 3d. This is obviously one of the markets' major contradictions and emphasizes the uncertainty which now exists within the perimeters of the City. A few weeks ago these shares were being 'talked up' to 30s. and the move, on a long term basis, appeared justified. Nothing has changed within the company, in fact the position has probably improved and yet the shares are depressed. ENGLISH CHINA CLAYS ordinary were one of the few 'leaders' to attain a new 1958/59 peak level in the past two weeks. Constant buying of these shares has lifted the price to 50s. 7½d.; it has been as high as 51s. 3d. The buying appears to be based on reports of a swing round in the paper manufacturing industry, particularly the 'wrapping' and 'quality' side. As china clay is an essential ingredient for this trade the market is becoming more optimistic about the outlook for ECC shares.

Demand for P. B. COW has rather surprised the City and has lifted the shares to a new peak of 6s. 6d. KLEEMANN ordinary and preference have also encountered modest support which is reflected in the quotations. RUBBER IMPROVEMENT ordinary, however, were being sold by the 'weaker' holders and the price deteriorated to 6s.—the lowest level of the 1958/59 period. Recent buyers of the ordinary shares of the UNIVERSAL ASBESTOS group are now proved right in their hope of a rise in dividend. The company has just

Continued on page 257

Share Price Movements

Par Value	Company	1958-59 High	Low	Jan. 31	Latest
5/-	Albright & W. Ord.	21/3	13/4½	21/3	20/3
£1	„ „ „ 5% Pref.	16/7½	15/4½	16/6	16/6
5/-	Anchor Chemical Ord.	11/6	10/3	10/9	10/9
5/-	Andersons Rub. Ord.	4/3¾	3/-	3/1½	3/1½
2/-	Anglo-Amer. Vulc. Fibre Ord.	4/3	2/-	3/9	3/9
£1	Angus Geo. Ord.	29/10½	21/-	29/3	28/1½
5/-	Armitage (Sir Elk.) Ord.	4/10½	2/3	4/9	4/-
5/-	Ault & Wiborg Ord.	12/6	11/9	12/3†	11/10½
5/-	„ „ New Ord.	12/6	12/3	12/6	12/1½
£1	Avon India Rubber Ord.	42/-	27/-	38/9*	36/3
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	17/6
10/-	Bakelite Ord.	23/3	17/-	22/9	22/9
£1	„ 6% Pref.	19/6	18/3	18/3	18/3
£1	Baker Perkins Ord.	45/7½	30/7½	45/-	45/-
4/-	Bank Bdg. Rubber Ord.	2/7½	1/6	2/-	2/-
5/-	Boake (A.) Roberts Ord.	18/6	9/-	13/-	13/-
£1	„ „ „ 5% Pref.	15/1½	13/9	13/9	13/9
4/-	Brammer H. Ord.	15/-	9/-	14/-	15/-
5/-	Bridge, David Ord.	26/9	16/3	26/6	26/6*
5/-	Bright, John Ord.	13/10½	8/9	10/-	10/-
2/-	Brit. Ind. Plas. Ord.	7/7½	4/9	7/6*	7/3
2/-	„ 10% (tax free) Pref.	5/9	4/8½	4/9	4/9*
£1	British Xylonite Ord.	50/6	28/6	50/-	48/9
£1	„ „ 5% Pref.	15/6	14/-	14/9	14/9
5/-	BTR Ind. Ord.	13/3	9/4½	11/3	11/-
£1	„ „ 7½% Pref.	22/6	20/9	22/6	22/6
£1	Courtaulds Ord.	35/-	20/-	34/6	33/3
£1	„ 5% 1st Pref.	18/6¾	15/7½	16/6	16/6
£1	„ 6% 2nd Pref.	19/6	17/1½	19/7½	19/6
4/-	Cow, P. B. Ord.	6/6	3/6	6/-	6/6
£1	„ 5% Pref.	13/6	10/9	11/-	12/6
5/-	Dale, John Ord.	15/-	10/-	11/-	11/-
£1	„ „ 6% Pref.	15/10½	13/-	15/7½	15/7½
1/-	Dann'mac Mfg. Ord.	6/-	2/6	5/10½	5/10½
10/-	De La Rue Ord.	33/3	20/9	32/6	32/-
£1	„ „ „ 3½% Pref.	11/9	10/-	11/-	11/-
6/8	Distillers Co. Ord.	27/-	15/9	24/9	24/3
£1	„ „ 6% Pref.	20/10½	19/10½	20/6	20/-
£100	„ 5% Conv. Loan	£96½	£91	£93½	£93½
£100	„ 5½% Unsec. Loan	£93½	£87 7/16	£93	£93
10/-	Dunlop Rubber Ord.	26/7½	14/9	24/-	23/-
£1	„ 5½% Pref.	18/9	15/10	17/6	17/3
£100	„ 3½% 1st Debs.	£73	£67¾	£72½*	£72¾
£100	„ 4½% 2nd Debs.	£81	£78	£79½	£79½

*Ex-dividend

Par Value	Company	1958-59 High	Low	Jan. 31	Latest
4/-	Ebonite Cont. Ord.	13/3	7/6	13/3	13/3
£1	English China Clays Ord.	51/6	29/9	49/4½	50/7½
£1	Goodyear Tyre 4% Pref.	12/9	12/-	12/6	12/6
5/-	Greeff Chem. Ord.	17/9	14/-	16/6	16/6
10/-	„ „ 5½% Pref.	8/-	7/9	8/-	8/-
4/-	Greengate & Irwell Ord.	7/0¾	4/9	5/3	5/3
1/-	Hunt & Moscrop Ord.	1/5	1/1½	1/3	1/3
£1	Imp. Chem. Ord.	38/-	28/3	35/6	34/3
£1	„ „ 5% Pref.	17/3	16/-	16/6	16/6
£100	„ 4½% Unsec. Loan	£87	£80	£86	£86
£100	„ 5½% Conv. Loan	£121	£99	£119½	£117½
1/-	Kleemann (O. & M.) Ord.	5/5½	2/6	4/9	5/1½
£1	„ „ 6½% Pref.	16/3	15/-	15/-	16/-
2/-	Lacrinoid Prod. Ord.	2/-	1/5¾	1/6	1/6
5/-	Laporte Ind. Ord.	20/7½	13/7½	20/3	20/3
£1	„ „ 7½% Pref.	22/10½	21/10½	22/3	22/3
£1	Leyland & Birm. Rubber Ord.	74/6	41/-	73/9	73/9
£1	„ „ 6% Pref.	21/3	16/1½	16/10½	16/10½
2/-	London Rubber	13/1½	8/6¾	12/9	13/-
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9
£1	McKechnie Bros. Ord.	45/-	32/6	45/-	45/-
£1	„ „ 'A' Ord.	44/6	30/-	42/6	42/6
£1	„ „ 6% Cum. Pref.	16/3	16/-	14/3	16/3
5/-	Monsanto Chem. Ord.	16/4½	13/-	16/-	15/-
£1	„ „ 3¾% Pref.	12/6	11/-	12/-	12/-
£100	„ „ 6% Debs.	£104	£101¼	£103	£103
£1	North British Rubber	—	—	15/3	15/3
2/-	RFD Ltd. Ord.	5/3	3/5½	4/9	5/-
£1	„ „ 5½% Pref.	14/6	11/6	13/9	12/6
2/-	Rubber Imp. Ord.	15/-	6/-	6/6	6/-
2/-	„ „ 'A' Ord.	15/-	6/-	6/6	6/-
£1	„ „ 5% 1st Pref.	12/3	10/-	10/-	10/-
5/-	Rubber Reg. Ord.	13/-	11/-	11/-†	11/-
4/-	Shaw Francis Ord.	15/9	9/9	15/7½	14/10½
2/-	Silentbloc Ord.	—	—	—	8/-
2/-	Sussex Rubber Ord.	1/8	7½	1/4½	1/4½
5/-	Sutcliffe Speak. Ord.	7/4½	5/-	6/3	6/3*
£1	Turner & Newall Ord.	73/9	52/-	72/6	71/3
£1	„ „ 7% Pref.	24/-	22/1½	23/3	23/9
5/-	Universal Asbestos Ord.	17/-	8/0¾	16/6	16/6
5/-	Viscose Dev. Ord.	10/7½	6/3	10/7½	10/-
5/-	Warne William (Holdgs.) Ord.	11/10½	8/-	11/3	11/-

†Ex-cap.

Rubber Markets

LONDON

The feature of the London rubber market during the past week has been the demand for nearby supplies. Reflecting this demand, Spot is ⅜d. higher at 25⅜d. per lb. Forward positions, however, are only around ⅛d. higher. General conditions in the market have been quiet but a firm tone was maintained on most days.

Latest prices are as follows:
No. 1 RSS Spot: 25⅛d.-25¼d.

Settlement House:
March 25⅜d.-25½d.
April/June 25⅛d.-25⅜d.
July/September 25⅜d.-25⅝d.
October/December 25⅝d.-26d.
January/March 26d.-26⅛d.

No. 1 RSS cif basis ports:
February 25⅛d.-25⅜d.
March 25⅛d.-25⅛d.

Godown:
February 85¼ Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, February / March shipment, 14s. 9d. seller, cif European ports. Spot, seller, 15s. 3d. Bulk, seller, 15s. Creamed, seller, 14s. 4d. Normal, seller, 11s. 4d.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on February 2 was 106 (106) Ceylon cents per lb.

NEW YORK

The following landed prices ruled in New York on February 9:

Dealers' Prices

	Cents per lb. Feb. 9	Previous
No. 1 RSS, Feb.	30⅜b–30⅝a	30⅛b–30¼a
Mar.	30⅜b–30⅝a	30¼b–30½a
No. 2 RSS, Feb.	29⅞b–30⅛a	30 b–30¼a
Mar.	29⅞b–30⅛a	30 b–30¼a
No. 3 RSS, Feb.	29⅝b–29⅞a	29⅛b–29⅜a
Mar.	29⅝b–29⅞a	29⅛b–29⅜a
No. 1 RSS, Spot	30⅜b–30⅝a	30⅛b–30¼a
No. 3 amber blanket crepe, Feb.	28¾t	28⅛b–28⅜a
No. 1 latex, thin crepe, Feb.	30¾b	30⅜b–31a
No. 1 latex, thick crepe, Feb.	30⅛b	30b

Futures—Rex Contract

	Close	Prev. Close
March ..	30.50b–30.70a	30.60b–30.80a
May ..	30.55b–30.60a	30.60b–30.65a
July ..	30.55t	30.60t
Sept. ..	30.55b–30.60a	30.60b–30.65a
Nov. ..	30.55b–30.65a	30.60b–30.65a
Jan. ..	30.60t	30.60t
March ..	30.63b–30.70a	30.55b–30.65a

Sales: 67. Tendency: Steady.

Rubber futures were about steady in modest dealings on February 9. Traders said that with the Singapore market closed because of the Chinese New Year, offerings from the Far East were small, with a limited factory interest reported. The undertone of physical rubber was steady.

Crepe Rubber

The following prices ruled in New York on February 4:

Dealers' selling prices:	Cents per lb.
Sole crepe, standard grade 'A'	48 (48)
Thick crepe	32 (32⅛)

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on February 10 was 27.50 US cents per lb.

SINGAPORE

Market closed on February 9 and 10.

Synthetic Rubber Prices

The range of US Rubber Co. synthetic rubbers marketed in this country by the Rubber Regenerating Co. Ltd., has been extended to include Paracril ALT. The price of this is 51d. per lb. ex store UK. In addition, the company is also handling Naugatex synthetic latices on behalf of Naugatuck Chemical International, and the prices for these materials, ex warehouse UK, in pence per lb., dry weight, are as follow:

Naugatex	
2000	39
2001	39
2002	39.5
2006	43
2105	40
2107	40
2108	40
2711	39
2714	39
2733	39
2740	43

A number of additions has been made to the range of synthetic rubbers manufactured by Firestone in the US. The amended list, with prices in pence per lb., is as follows:

FR-S (Firestone)	(cif UK dp)*
1000 Hot	23.187
1001 „	23.187
1004 „	23.187
1006 „	23.187
1500 Cold	23.187
1502 „	23.187
146 „	23.187
1703 Oil-Extended	20.125
1712 „	18.5
123 „	19.187
155 „	18.5
173 „	20.125
178 „	18.75
1009 Specialty	24.625
1010 „	25.812
1012 „	24.187
1013 „	24.875
1014 „	27.75
1015 „	28.75
141 „	28.625
158 „	29.562

* US/£ conversion rate $2.80

AMSTERDAM

The Amsterdam rubber market ruled as follows on February 9:

No. 1 RMA	Guilders per kilo Feb. 9	Previous
February	2.46	2.45
March	2.46½	2.45
April ..	2.47	2.47
May	2.47½	2.47
June	2.48½	2.47
April/June	2.47½	2.47
July	2.50	2.50
August	2.50	2.50
September	2.50	2.50

Sales: 30. Tendency: Steady.

DJAKARTA

Market closed on February 9 and 10.

STOCK MARKET

Continued from page 256

announced a payment for the year to September last of 20%, which compares with 17½% last time. This lift is accompanied by profits of £335,000, compared with £201,000. After taxation of £183,000 against £117,000, there is a net figure remaining of £152,000 against £84,000. The earnings are sufficient to cover the ordinary distribution at least twice over and the yield at the current price of 16s. 6d. is in the region of 6%. The above figures, in fact, represent a rather surprising recovery in the fortunes of this concern. The current profits are not quite a record but they are obviously very satisfying in view of the cautious forecasts made by the board last April when it raised new capital by an issue of loan stock.

The directors of Silentbloc have declared an interim dividend of 12½% which is the same as a year ago when it was followed by a final of 12½% to make 25% for the year. Despite news of orders worth around £400,000 from European countries the ordinary of the Francis Shaw concern were an unstable market. The orders came from Eastern Europe and were for the supply of rubber and plastics manufacturing machinery. The biggest—amounting to nearly £180,000—came from Moscow.

The Marley Tile group has also been in the news with its link-up with American, Belgian and French firms in the formation of a new company manufacturing probably in Italy. The chairman also announced that for some time the board had been considering the problem of simplifying the rather involved capital structure of the group. It is now hoped to submit proposals soon for the marriage of the two existing preference shares into one common unit. It is also intended, as part of this plan, to issue one of the new preference shares free to the ordinary holders for each eight shares held.

The Kleemann group has signed an agreement with an offshoot of the National Distillers and Chemical Corporation of America under which it will have the sole UK marketing rights for polythene resins distributed under the trade name of 'Petrothene.'

Industry INTELLIGENCE

Technical Data

Reinforcing Clay

A light-coloured reinforcing clay, called Claytex, has been introduced by Franterre SA. It is of remarkably fine particle size; the electron microscope shows diameters of between 0.2 and 0.5 microns whereas most kaolins have somewhat bigger particles.

Claytex is a chemically activated clay of high reinforcing power, although it is, of course, somewhat inferior to Frantex in this respect.

The product should be of particular interest to manufacturers of light-coloured moulded articles, floor covering, extruded articles, electric cables, etc.

The UK importers are Witco Chemical Co. Ltd., Bush House, Aldwych, London, W.C.2, who are the agents for Franterre, S.A., in this country.

Resistance of Butyl Rubber to Certain Chemicals

The physical properties of a Polysar Butyl 301 vulcanizate have been determined before and after immersion for 70 hours at room temperature in (a) acetone; (b) ethyl alcohol; and (c) butyraldehyde. The compound contained 75 phr of FEF black and the test results are reported in Polysar Technical Report No. 7:10A, by W. J. Abrams, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. Only slight changes in the hardness, modulus and tensile strength of the vulcanizate were noted after immersion in the above chemicals, while swelling of the rubber was also of a low order.

Polythene Film

Rigidex polythene is easily extruded and it may be processed on conventional equipment using a circular die to give blown (layflat) film over a wide range of thicknesses. Information on this film and its production is given in Rigidex Technical Information Sheet No. 6, issued by British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1.

Five types of Rigidex are available, and of these, type 9 is normally recommended for the extrusion of blown film. This grade gives a moderate degree of resistance to environmental stress-cracking combined with excellent toughness and resistance to low-temperature brittleness. Alternatively, type 15 may be employed on existing equipment where ease of processing is advantageous. Heavy Rigidex film made by extrusion blowing is suitable for forming self-supporting components where rigidity is essential. Typical extrusion conditions for Rigidex are listed and data are given for the properties of (a) blown film of various blow-up ratios and thicknesses; (b) layflat film; and (c) Rigidex types 9 and 15.

Pigments for Stoving Finishes

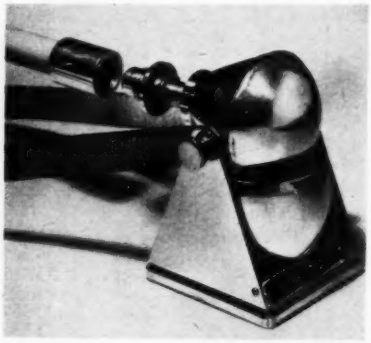
Epoxy resins are used in conjunction with urea-formaldehyde resins to produce stoving finishes for industrial and domestic equipment. Pigments for use in such finishes should have good heat fastness together with good resistance to acids and alkalis. The performance of some 30 I.C.I. pigments in such finishes has been assessed using a 70:30 blend on solid resin of Epikota 1007:Paralac 6001 dissolved in Cellosolve acetate:toluene (1:1) as the medium.

Tests were carried out for fastness to heat, acids (hydrochloric and nitric), alkali (caustic soda) and overspray. The test procedure used together with the results obtained are detailed in I.C.I. Technical Information — Dyehouse No. 469.

Machines, Materials and Equipment

Radioactive Isotope Container

A new range of isotope containers for Gamma radiography is being manufactured by R. F. Fraser-Smith,



69 King's Cross Road, London, W.C.1. Suggested applications for rubber or plastics include: Checking electrical connexions and elements embedded in rubber or plastic; checking the correctness of assemblies in rubber or plastic mouldings, without dismantling and testing for blowholes in mouldings, made from, for example, polystyrene.

The metal-ended stick seen in the top left of the picture screws anti-clockwise and when tightened and the movement continued it will unscrew the section containing the isotope itself, enabling this to be held at a safe distance. The operative end is that opposite to the stick connexion.

The choice of isotope depends on circumstances, and sometimes X-rays may be necessary; however, Gamma radiography is remarkably versatile, and Gamma ray equipment very much less expensive than X-ray equipment.

When loaded with the appropriate isotopes, these containers give adequate protection, are very simple in construction and operation, and, owing to their design, have a very good weight/protection ratio.

R. F. Fraser-Smith supply a wide range of non-destructive testing equipment, and can advise on appropriate techniques or choice of apparatus.

Publications Received

I.C.I. Silicones

Silicone fluids, rubbers, resins and a number of miscellaneous products manufactured by I.C.I. Ltd. are described in 'Looking for Trouble,' a new booklet. The properties of silicones—serviceability at temperature extremes, etc., are outlined, and a list of applications given.

The Story of Technology

Latest in the 'This Is Du Pont' series of publications is 'The Story of Technology.' This well-produced booklet traces the growth of man's technical skills from prehistoric times and shows how technology has shaped the world in which he lives, providing material necessities and comforts, and creating, as well, the wealth to support cultural and humanitarian progress.

EDA Electrified Production No. 1

The aim of the new booklet, EDA Electrified Production, being published by the Electrical Development Association, 2 Savoy Hill, London, W.C.2, is to suggest new electrical solutions to industrial production problems and to strive for the greater use of electricity in production engineering. The first issue of the booklet, which appeared in November, contained a message of best wishes from Viscount Chandos, president of the EDA in the years 1956-58.

ABCM Work Study

'Notes on Work Study' No. 3, has been released by the Association of British Chemical Manufacturers. It deals with case histories from smaller firms and individual plants in the chemical industry. At present, something like 80% of the people employed in the industry belong to firms who are applying work study in their organizations, the booklet states. Copies can be obtained from the Association at Cecil Chambers, 86 Strand, London, W.C.2. Price: 3s. 3d., net: 4s. post free.

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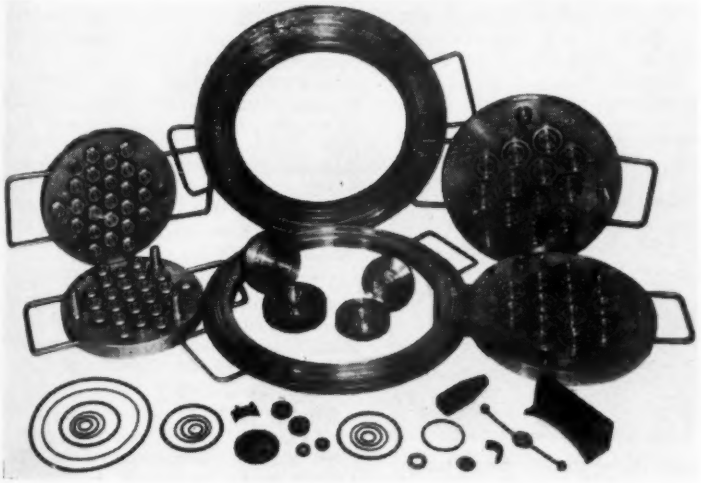

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Export Opportunities

South African Agency

Mr A. B. Tingey of Beresford Agencies, P.O. Box 8394, Johannesburg, manufacturers' representatives, is at present on a business visit to the UK. He is interested in contacting UK firms who require a representative in South Africa to submit tenders on their behalf to South African Government departments (including railways) and Municipal Authorities, and who require direct selling representation in the South African market.

Firms wishing to contact Mr Tingey while he is in the UK should write to him direct c/o 71 Grove Avenue, London, N.10. Board of Trade reference ESB/26290/58.

Foam Rubber for Ethiopia

I.L.E.A. Wood Industry, P.O. Box 141, Addis Ababa, have advised the British Embassy at Addis Ababa that they are seeking UK sources of supply of, among other items, foam rubber by the metre.

Suppliers interested in this inquiry should write direct to I.L.E.A. Wood Industry and notify the British Embassy, Commercial Department, P.O. Box 858, Addis Ababa, that they have done so. Board of Trade reference ESB/266/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

COMPANIES in the NEWS

Plastic Engineers

Trading profits of Plastic Engineers, manufacturers of thermo-plastic products and precision engineering components in nylon, etc., recovered from £9,363 to £34,310 in 1958. A final dividend of 10% makes a 15% total, against 5%. These results, state the directors, indicate a continuance of the improving trend throughout 1958. This encouraging trend, they add, continues into the current year. The trading balance is struck after providing £23,085 (£18,811) for depreciation, directors' remuneration and audit fees. A year ago £7,266 was written off bad debts and £5,742 cost of special tools not recoverable from customers was charged, leaving a deficit of £3,645.

NBR and BPC

At a meeting of the Dumfries Local Committee of the British Productivity Council, Mr J. A. Wall, of the North British Rubber Co. Ltd., was appointed secretary. The vice-chairmanship, vacant for some months, was accepted by Mr E. Owen, I.C.I. Ltd.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

London Section.—Tuesday February 17 at the Wellcome Foundation, 183 Euston Road, London, N.W.1, at 6.30 p.m. 'Sources of Raw Materials for the Plastics Industry', by Dr A. W. C. Taylor, B.Sc., Ph.D., F.R.I.C., I.C.I. Ltd. Joint meeting with the Plastics Institute.

Manchester Section. — Monday, February 23 at the Grand Hotel, Manchester, at 6.45 p.m. 'Developments in the Technology of the Direct Moulded Footwear Process', by C. E. Webb, B.Sc., A.R.I.C., A.I.R.I., C. and J. Clark Ltd.

Scottish Section. — Saturday February 14. Smoking Concert.

PLASTICS INSTITUTE

London and District Section. — Tuesday February 17 at the Wellcome Building, 183-193 Euston Road, London, N.W.1, at 6.30 p.m. 'Sources of Raw Materials for the Plastics Industry', by A. W. C. Taylor, B.Sc., Ph.D., F.R.I.C., I.C.I. Ltd. Joint meeting with the Institution of the Rubber Industry.

Midlands Section. — Friday February 20, at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3, at 6.30 p.m. 'Recent Developments in the Applications of Epoxy Resins', by P. A. Dunn, Ciba (ARL) Ltd.

North Eastern Section. — Wednesday February 18 in the Eldon Grill, Grey Street, Newcastle, at 7 p.m. 'The Application of Polyester Resins,' by E. Boott, Scott Bader and Co. Ltd.

Scottish Section. — Wednesday, February 18 at More's Hotel, Glasgow, at 7.30 p.m., 'European Free Trade,' by P. Russell, B.Sc., A.R.I.C., BIP Chemicals Ltd.

A Seddon DD-8 chassis diesel tanker with a capacity of 3,500 gallons is being used by Vitafoam Ltd., Don Mill, Middleton, Manchester, to carry latex rubber between its Middleton and Liverpool factories. The lorry was manufactured by Seddon Diesel Vehicles Ltd., Oldham, and fitted with a tank made by Andrews Bros. (Bristol) Ltd., Regent Street, Liverpool. The tanker, which uses compressed air for loading and discharging latex, is powered by a Gardner 6LX direct injection diesel engine developing 150 bhp

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from "The Trade Marks Journal"—given below are reproduced by permission of the Controller of H.M. Stationery Office.

KUTERLEX (782,162) For tubes of common metal having exterior sheaths of plastics (not being boiler tubes or parts of machines). By Yorkshire Imperial Metals Ltd., Haigh Park Road, Stourton, Leeds, Yorkshire. To be associated with No. 623,621 (3413, 361) and others. (Class 6; January 7 1959.)

PALL-RING (782,699) For random packings made of plastics for use in the columns and towers of industrial - chemical installations. By Badische Anilin- and Soda-Fabrik Aktiengesellschaft, 38 Friesenheimer Strasse, Ludwigshafen - on - Rhine, Germany. Address for service is c/o J. Y. and G. W. Johnson, 47 Lincoln's Inn Fields, London, W.C.2. To be associated with No. 721,362 (3940, 1113) and others. (Class 17; January 7 1959.)

LITEX (775,360) For lights for roofs and windows; all made of reinforced translucent plastics in imitation of glass; and fittings for these goods included in Class 19. By Queenstown Engineering Co. Ltd., Queen's Circus, London, S.W.8. (Class 19; January 7 1959.)

ELONITE (780,006) For decorative panels made of laminations of plastics for use in building. By Torsten Odquist, Sven Elof Hansson, Gunnar Hansson, Lars Philip Sjögren, Nils Odquist, Bengt Kihlberg and Bo-Elof Hansson, trading as Elof Hansson, Stampgatan 2, Gothenburg, Sweden. Address for service is c/o London Boxboard Co. Ltd., 129 Cannon Street, London, E.C.4. (Class 19; January 7 1959.)

SPELLOBLOX (B774,339) For spelling playthings. By Shipton Plastics Ltd., Ferndown, Northwood Hills, Middlesex. To be associated with No. B774,340 (4200, 50). (Class 28; January 7 1959.)

RWGL (B781,664) For plastics in the form of sheets, blocks, rods, pipes, tubes and of shaped sections, and articles made from such plastics, all included in Class 17. By RWG Ltd., 121 Ebury Street, London, S.W.1. (Class 17; January 7 1959.)

TAWPLAS (782,190) For small domestic utensils and containers made of plastics. By Taw Manufacturing Co. Ltd., Campsbourne Works, High Street, Hornsey, London, N.8. To be associated with No. 570,229 (3049, 1086) and others. (Class 21; January 7 1959.)

NEW COMPANIES

Resinoid and Mica Products Ltd. (617,959). — January 1. Capital: £10,000 in 100 ordinary and 9,900 5% non-cumulative preference shares of £1 each. To carry on the business of designers, manufacturers of and dealers in plastic materials, resins, etc. The directors are: Joseph R. Severn and Mrs. Jill G. Severn, both of Lindens, London Road, Sunningdale; Batistta J. Moriondo, 102 Bramley Road, London, N.14. Regd. office: Winchester House, Old Broad Street, London, E.C.2.

Whittlesford Manufacturing Co. Ltd. (617,992).—January 1. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in decorations and novelties, games and toys, electric heating devices and plastics, etc. The directors are: Frederick J. Harlow, 8 St. Regis, Chesterton Road, Cambridge; George E. Williamson, 232 Coldhams Lane, Cambridge. Regd. office: 10 Jesus Lane, Cambridge.

J. T. Clarke and Son (Warrington) Ltd. (618,124).—January 2. Capital: £12,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastics, hardware, chandlery, drysalters, ironmongers, etc. The directors are: John T. Clarke and Ethel M. Clarke, both of 'Sunnydale,' 94 Walton Road, Stockton Heath, Warrington; Kenneth J. Clarke, 20 Oakdale Avenue, Stockton Heath, Warrington; Mrs. Joan R. Ashall, 54 Whitefield Road, Stockton Heath.

E. R. Holloway Sales Ltd. (618,185). —January 5. Capital: £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in fancy goods of all kinds and plastic materials, etc. The directors are: Albert R. Holloway, Derings, Lockley Park, Welwyn; Douglas A. Clarke, Ashfield, Harmer Green, near Welwyn; Gordon C. Clarke, Harold S. Holloway, Joseph W. Turner, Trevor G. Evans and Robert H. Carter. Regd. office: 17 Bessemer Road, Welwyn Garden City, Herts.

Malcolm Thomas (Plastics) Ltd. (618,330).—January 6. To carry on the business of manufacturers of and dealers in plastics modelling and moulding materials, etc. The directors are: Malcolm O. Thomas, 3 Thornton Grove, Hatch End, Middlesex; and Gordon H. Tailby, 34 Laughton Road, Northolt, Middlesex. Regd. Office: 26 Abbey Manufacturing Estate, Mount Pleasant, Alperton.

P. R. Jefferies and Co. Ltd. (618,341).—January 6. Capital: £500 in £1 shares. To carry on the business of growers of and manufacturers of fibres, plastics, and moulding and modelling materials, etc. The directors are: Peter R. Jefferies and Mrs. Phyllis D. Jefferies, both of Pleasant View, Heathbank Road, Cheadle Hulme. Regd. office: 3 Hempshaw Lane, Stockport, Cheshire.

Changes of Name

Panawal Rubber Co. Ltd. (38,468), 103 Cannon Street, London, E.C.4.—Name changed to George E. Gray Holdings Ltd., on December 12 1958.

Bewdley Leather Works Ltd. (539,783), Seven Side South, Bewdley. —Name changed to Bewdley Leather and Plastic Co. Ltd., on December 18 1958.

PATENT LIST

Printed copies of the Specifications in the following list can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on February 4 1959

Esso Research and Engineering Co. Hydration of propylene. 809,318.

Chemische Werke Hüls A.G. Stabilizers for aliphate, aromatic and heterocyclic compounds containing vinyl groups. 809,320.

Open to public inspection on February 25 1959

British Cellophane Ltd. Web-yarns or film-winding mechanisms. 809,508.

Owens-Illinois Glass Co. Forming of hollow plastic articles. 809,534.

Ciba Ltd. Process for the manufacture of emulsions of hardenable artificial resins and emulsions so obtained. 809,504.

Ciba Ltd. Alkylleneimino derivative of hydroquinone and process of making same. 809,535.

Imperial Chemical Industries Ltd. Polymerizable compositions. 809,658.

Monsanto Canada Ltd. Stable solutions of water-soluble amino-aldehyde resins. 809,662.

Süd - West - Chemie G.m.b.H. Method of producing a welded point for interengaging moulded elements consisting of thermoplastic synthetic resins. 809,560.

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EXECUTIVE directorship required by graduate director with experience in general rubber goods manufacture—belts, hose, lining chemical equipment, rubbers for textile mills, precision rubbers, bonding, rollers, mouldings.—Box 252.

GENERAL manager or works director, 20 years' technical and management. Wide knowledge of mechanical rubber production. Capable of managing existing factory or planning, equipping and managing a new one.—Box 251. (251)

APPOINTMENTS WANTED

(continued)

S.T.O., 16 YEARS rubber and plastics, specialised experience surface coatings and adhesives. Senior staff appointment desired with reputable company in managerial/technical capacity.—Box 254. (254)

APPOINTMENTS VACANT

6d. a word, Minimum 10/- Box 2/-

APPLICATIONS are invited for the position of rubber technologist/chemist of a South African company of rubber manufacturers. Applicants must be fully experienced and capable of working under own initiative. Practical experience in synthetic/natural rubber compounding, mill and process control essential. A knowledge of mechanical mouldings, heavy duty hose and rubber to metal lining advantageous. Applications, giving full details of age, marital state, qualifications and experience, should be addressed to the Manager, P.O. Box 1982, Johannesburg, South Africa. (227)

APPOINTMENTS VACANT

(continued)

A VACANCY occurs for a young rubber technologist of L.I.R.I. standard. Experience in footwear compound would be an advantage. This is an opening with good prospects. Applications, which will be treated with confidence, should be addressed to:—Sam Kay Rubber Co., Ltd., Hope Mill, Portwood Place, Stockport. (256)

DEVELOPMENT engineer required for a large rubber company in the Midlands. Required standard B.Sc. or H.N.C. Some experience in the rubber industry an advantage but not essential. Applications, giving details and salary required.—Box 250. (250)

ENGINEER with knowledge of rubber machinery, both use and design, preferably under 35, but not essential. Good prospects with expanding firm building rubber machinery in the South. State age, experience, qualifications and salary required.—Box 245. (245)

GEORGE ANGUS AND CO. LTD., require a production manager for rubber and plastics factory established recently in Newcastle upon Tyne. He will join a new management team and will be responsible to the general manager for manufacture of mechanical rubber products including conveyor belting and hose, and for control of 250 operatives. Applicants must have relevant experience in the rubber industry and should preferably have knowledge of PVC processing. An attractive salary will be paid and opportunity is offered for later appointment as works manager. Removal expenses will be paid and the company operates house purchase and pension schemes. Applicants, preferably aged 30-45, should write to Group Appointments Officer, George Angus and Co. Ltd., Westgate Road, Newcastle upon Tyne, 1. (253)

LABORATORY assistant, young male, interested in scientific subject, with previous laboratory experience preferred. Required as part of team dealing with control testing of rubber and latex manufactured goods. Experience in rubber, plastics or latex an advantage but not essential. Time allowed for further studies if required. Five-day week, canteen facilities. Write:—Chief Chemist, Box B.647, c/o Streets, 110 Old Broad Street, E.C.2. (258)

RUBBER/PLASTICS technologist required for progressive factory in London area. Minimum L.I.R.I. or similar. Age 30 to 45. Pension scheme. Will be in sole charge of laboratory. Knowledge of synthetic and resin rubbers preferable.—Box No. W.3005, Haddons, Salisbury Square, London, E.C.4. (236)

SPECIALIST required to promote the sale of synthetic rubber to the flooring manufacturing industry. Applicants must have a technical qualification, and have some years experience, preferably within the industry, of the use of plastics and rubber in flooring. Preferred age, 30/35. Write giving details of age, experience, education and salary required, to:—Box 261.

THE Ault and Wiborg Group require a chemist, preferably technically or academically qualified, to look after a section in its research laboratory. Experience in rubber, plastics or adhesives is essential. The company has further plans for expansion and prospects and remuneration are excellent. Please apply with full particulars to:—Research, Ault and Wiborg Ltd., Standen Road, S.W.18. (238)

WORKS chemist required, preferably with experience in cable manufacture. Good salary and prospects. Contributory pension scheme. Reply stating age, qualifications and experience, to:—General Manager, The Metropolitan Electric Cable and Construction Co. Ltd., Clyde Works, Chadwell Heath, Essex. (248)

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A JOHANNESBURG manufacturer of rubber sheeting, etc., is interested in a secondhand slitting and rewinding machine known in the trade as Type B.30. Replies to:—Box 257. (257)

BROADWAY BARGAIN STORES, 140/2 The Broadway, Wimbledon, S.W.19, are cash buyers of seconds and clearing lines in household rubber gloves, rubber footwear, swimwear, rubber aprons and sheeting. Buyer calls. Phones: LIB 8066 and BAL 5321. (259)

REQUIRED, butt splicing machine for cycle inner tubes. Detailed specifications and price to:—Box 262. (262)

WANTED, micro and resin rubber waste, in black and coloured.—Box 169. (169)

WANTED, modern No. 21 Cochran vertical boiler, 105 psi, with fittings and extended skirt.—Box 229. (229)

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